

3 COMMENTS AND RESPONSES

This chapter contains comment letters received during the public review period for the Draft EIS, which concluded on July 9, 2018, including copies of the summary notes of oral comments from public hearings. Table 1-1 in Chapter 1, “Introduction,” of this Final EIS presents the list of commenters, including the numerical designation for each comment letter received, the author of the comment letter, and the date of the comment letter. This chapter provides written responses to all comments received on the Draft EIS.

The comment letters and oral comments are reproduced in their entirety and are followed by the response(s). Where a comment letter addresses multiple topics, each topic is considered a separate comment. Each separate comment is indicated by a line bracket and an identifying number in the margin of the comment letter.

3.1 MASTER RESPONSES

Several comments raised similar and/or related issues. Rather than responding individually, master responses have been prepared to address related comments comprehensively. A reference to the appropriate master response is provided, where relevant, in responses to individual comments. The following master responses are included in this Final EIS:

- ▲ Master Response 1 – The Shoreline Plan and Planning Process
- ▲ Master Response 2 – Effects on Recreation
- ▲ Master Response 3 – Motorized Boat Use Estimates
- ▲ Master Response 4 – Watercraft Emissions
- ▲ Master Response 5 – Growth and Mitigation under the Existing Shorezone Regulations
- ▲ Master Response 6 – Monitoring and Adaptive Management of the Shoreline Plan

3.1.1 Master Response 1 – The Shoreline Plan and Planning Process

Many of the comments received during the public review period for the Draft EIS addressed the Shoreline Plan rather than the environmental analysis in the Draft EIS. Many comments provided support for or opposition to the proposed Shoreline Plan or other alternatives. Many comments suggested specific revisions to the proposed Shoreline Plan. To provide a comprehensive response to these comments on the Shoreline Plan, this response addresses the following topics:

- ▲ the consensus-based planning process and
- ▲ how comments on the Shoreline Plan are considered.

THE CONSENSUS-BASED PLANNING PROCESS

TRPA carried out a consensus-based planning process to develop the proposed Shoreline Plan, as described in Chapter 1, “Introduction,” of the Draft EIS. TRPA procured the expert services of a nationally recognized third-party, neutral mediation firm, the Consensus Building Institute (CBI), to design and facilitate a stakeholder consensus building approach to Shoreline Plan development. Through CBI, TRPA convened a Steering Committee that included stakeholders with various interests and areas of expertise to develop policy recommendations in response to key issues. The Steering Committee consisted of senior-level representatives from the California State Lands Commission, Lahontan Regional Water Quality Control Board, Lake Tahoe Marina Association, League to Save Lake Tahoe, Nevada Division of State Lands, Tahoe Lakefront Owners’ Association, and TRPA. The Steering Committee met nearly 40 times over the 2-year

planning process. Each meeting was facilitated by an outside mediator who worked to develop consensus among the differing perspectives on the Steering Committee and from within broader stakeholder interests.

The shoreline planning process also provided opportunities for public involvement in a variety of forums. During the planning process, public workshops were held on the north and south shores to gather input and suggestions for the shoreline plan. TRPA met with nine boating businesses (both motorized and nonmotorized) and held 27 workshops or meetings with a diverse cross-section of community groups. Information from these workshops and meetings was summarized, and the key issues were presented to the Steering Committee. The Steering Committee considered these key issues and developed a set of policy recommendations to address and harmonize a wide array of disparate interests. To aid in providing the best available scientific and technical inputs to the Steering Committee's policy recommendations, TRPA, with the help of CBI, convened a Joint Fact-Finding Committee, as further described in Master Response 3.

As proposals were being developed, the Steering Committee policy recommendations were presented to the Regional Plan Implementation Committee (RPIC) of the TRPA Governing Board at 10 separate public meetings through the 2-year planning process. The RPIC reviewed and endorsed policy proposals recommended by the Steering Committee. The policy proposals that were recommended by the Steering Committee and endorsed by the RPIC constitute the proposed Shoreline Plan, described as Alternative 1 in the Draft EIS.

The Steering Committee also reviewed and endorsed the plan alternatives proposed for review in the EIS. The RPIC reviewed the recommended plan alternatives, and based on public input and other policy considerations, modified the alternatives, and endorsed the alternatives to the proposed Shoreline Plan analyzed in the EIS.

Finally, throughout the development of the Steering Committee's collaborative work, the recommended planning proposals were made publicly available on a widely-noticed public website (www.shorelineplan.org). This website is easily accessible from TRPA's homepage, and provided regular updates on the progress of substantive planning recommendations.

HOW COMMENTS ON THE SHORELINE PLAN ARE CONSIDERED

The public review period for the Shoreline Plan Draft EIS began on May 8, 2018 and concluded on July 9, 2018. During the public review period for the Draft EIS, five public meetings and workshops were conducted to solicit public input (as noted on page 1-6 of the Draft EIS). TRPA mailed more than 33,000 notices to residents in the region with information on the public meetings and how to comment on the plan or Draft EIS.

In response to the call for review and public comment on the draft documents, 149 comment letters and presentations of oral testimony were received: five comment letters from public agencies, 15 comment letters from stakeholder organizations (including environmental and business organizations), 68 comment letters from individuals, nine comment forms from open houses, and 52 oral comments received at TRPA public meetings and open houses. In addition to those comments submitted during the formal comment period for the Draft EIS, comments on the Shoreline Plan are accepted and considered at any time before adoption of the Shoreline Plan.

Consistent with the Compact, Code of Ordinances, and Rules of Procedure, this Final EIS provides written responses to comments that address the completeness, accuracy, and adequacy of the environmental analysis in the Draft EIS. Many comments and letters and much of the oral testimony received since release of the draft documents do not address the environmental review. Instead, they express opinions, make suggestions, pose questions, and express concerns about the substance of the Shoreline Plan itself. These policy-related comments offer a variety of perspectives regarding the Shoreline Plan alternatives, ranging from statements of support or opposition to very detailed recommendations regarding specific provisions of each alternative. Comments that do not address significant environmental issues raised during the public review period are summarized and identified in this Final EIS, and responses are provided to the extent

feasible. All public comments on the proposed Shoreline Plan have been made available to the TRPA Governing Board, Advisory Planning Commission, RPIC, and Shoreline Steering Committee for consideration.

Comments in Support or Opposition to an Alternative

The Draft EIS evaluates four alternatives that represent a range of approaches to achieve the purpose and objectives of the Shoreline Plan. Each of these alternatives is a viable option, and although the proposed Shoreline Plan has been recommended by the Steering Committee and TRPA staff, the TRPA Governing Board could adopt any of the alternatives. The Governing Board could also elect to combine features from different alternatives into a Shoreline Plan. Many of the comments received expressed support for, or opposition, to an alternative or component of an alternative. All comments in support or opposition to an alternative or component of an alternative are available to the TRPA Governing Board, Advisory Planning Commission, and RPIC and will be considered as those bodies consider the merits of the proposed Shoreline Plan.

In addition to those comments already submitted, additional public comments on the proposed Shoreline Plan and alternatives are welcomed by TRPA at any time and may be made at any of the following meetings of the Governing Board, Advisory Planning Commission, or RPIC, up to adoption of an alternative:

- ▲ TRPA Governing Board RPIC meeting, time to be determined, Wednesday, September 26, 2018, at the North Tahoe Events Center, Kings Beach, California;
- ▲ TRPA Advisory Planning Commission meeting, 9:30 a.m. on Wednesday, October 10, 2018, at the TRPA office, Stateline, Nevada; and
- ▲ TRPA Governing Board meeting, 9:30am on Wednesday, October 24, 2018, at the TRPA office, Stateline, Nevada.

Suggested Revisions to the Shoreline Plan

Many of the comments suggested revisions to the proposed Shoreline Plan. TRPA and the Steering Committee evaluated the feasibility of proposed changes and their consistency with the goals and scope of the Shoreline plan. In August 2018, the Steering Committee endorsed many of the policy recommendations suggested in public comments. TRPA then presented these further modifying recommendations of the Steering Committee to the RPIC, which reviewed and endorsed the proposed revisions on August 24, 2018. Many of the suggested revisions were incorporated into a revised proposed Shoreline Plan. The revised proposed Shoreline Plan represents Alternative 1 from the Draft EIS as revised by the Steering Committee and RPIC. Revisions to the proposed Shoreline Plan are described in Chapter 2, “Revisions to the Proposed Shoreline Plan,” in this Final EIS.

All suggested revisions to the proposed Shoreline Plan and alternatives are welcome and will be considered by TRPA. Public comments will continue to be accepted through adoption of a plan by the TRPA Governing Board. TRPA encourages all members of the public to make their voices heard by commenting in writing or at the meetings identified above.

3.1.2 Master Response 2 – Effects on Recreation

TRPA received several comments related to the effects of the proposed Shoreline Plan on recreation on Lake Tahoe and along the shoreline. Recreation comments suggest that the Shoreline Plan focus on beach use and nonmotorized recreation rather than boating and boating structures, request additional detail about how motorized boating could affect beach use and nonmotorized recreation, inquire about the boat density analysis, suggest use of the Water and Land Recreation Opportunity Spectrum (WALROS) in the recreation analysis, and request a more localized analysis of the effects of the proposed Shoreline Plan on recreation.

To provide a comprehensive response to comments on the Shoreline Plan and planning process, this response addresses the following topics:

- ▲ scope of the Shoreline Plan,
- ▲ recreation planning in Lake Tahoe, and
- ▲ Shoreline Plan recreation impact analysis.

SCOPE OF THE SHORELINE PLAN

A goal of the Shoreline Plan is to enhance the recreation experience along Lake Tahoe's shoreline. However, the plan is not intended to be the overall recreation plan for Lake Tahoe or the shoreline; rather, it is predominately a plan to set the development envelope for water-dependent structures along the shoreline, and to do that in the context of a mix of 55 percent public and 45 percent private property fronting the lake shore. It consists of ordinances and resource management programs that regulate and manage *structures* along the shoreline. In the Tahoe Region, most types of development, such as residential, commercial, and tourist accommodations, are strictly limited with caps on the total amount of development that can occur. By contrast, existing ordinances do not cap the total number of shoreline structures that could be developed and do not reflect the current understanding of the environmental effects of those structures. The proposed Shoreline Plan would set strict limits on the number of structures that could be built along the shoreline and enact regulations and programs to protect the environment and the recreational use and enjoyment of the Tahoe Region. The suggestion by some commenters for the Shoreline Plan to acquire more public shoreline to change the current mix of public and private use is outside the scope of this planning process. Programs to promote the acquisition of lands for public access are actively operated and managed but are not within the scope of this Shoreline Plan. Other regional planning initiatives are underway to holistically address the public recreation experience in the Tahoe Region.

As a regulatory instrument, the Shoreline Plan focuses on public and private structures along the shoreline and the levels of motorized boating that result from their use and operation because these activities have the potential to degrade the environment and the recreational enjoyment of Lake Tahoe. In the context of the plan's purpose to set development limits on the number, type, location, and design of new water-dependent shorezone structures, the proposed Shoreline Plan includes elements to protect and enhance nonmotorized recreation and beach use. The plan includes fewer of this type of regulation and program because recreation experience was looked at through the lens of the controls needed on development of structures. Enhancing passive recreation uses was not looked at holistically because that purpose was outside the scope of the Shoreline Plan and does not implicate developing new shorezone structures.

Nonmotorized Recreation Features of the Proposed Shoreline Plan

As described above, the Shoreline Plan is not intended to serve as the comprehensive recreation plan for beach use, swimming, and nonmotorized boating on Lake Tahoe, which is managed by various other plans and programs. Rather, the Shoreline Plan, consistent with the Recreation Element of the Regional Plan, includes features and provisions to enhance recreation where such provisions are within the scope of the plan. Examples include establishment of Shoreline Preservation Areas that prohibit private structures along undeveloped portions of the shoreline, caps on the number of structures that can be developed along the shoreline, design and location standards that protect public access and recreation opportunities, and additional public boat access facilities.

Within the noted limits, the scope of the plan includes access and navigation features to support nonmotorized recreation (see Draft EIS pages 2-37 through 2-38), and in response to public comments, TRPA is adding further elements to promote nonmotorized recreation. These elements are described in more detail in Chapter 2, "Revisions to the Proposed Shoreline Plan," in this Final EIS. The following nonmotorized recreation navigational and access features are included in the proposed Shoreline Plan, as described in the Draft EIS, or are required as mitigation measures:

- ▲ **Expand the 600-foot no-wake zone to include all of Emerald Bay.** This feature would restrict motorized boat speeds in one of the most popular nonmotorized recreation areas on the lake, which would reduce the potential for motorized boats to detract from the nonmotorized experience or result in conflicts (see Draft EIS pages 2-36 and 2-37).
- ▲ **Increase enforcement of the no-wake zone.** TRPA would provide an additional boat and crew to patrol and enforce the no-wake zone. TRPA would also enter into agreements with law enforcement agencies operating boat patrols on the lake to establish increased coordinated enforcement of TRPA and state boating requirements. The increased presence and enforcement would help to establish orderly interaction of users for peaceful nonmotorized recreation opportunities within 600 feet of the shore. More details on the enforcement program are provided in Appendix A, “Shoreline Implementation Program,” in this Final EIS.
- ▲ **Enforce design standards to protect nonmotorized navigation.** New, modified, or expanded shoreline structures would be required to comply with location and design standards that limit pier lengths to allow navigation around piers and buoys within the no-wake zone and provide public access along the beach, where it is legally allowed (see Draft EIS pages 8-14 and 8-23).
- ▲ **Regulate motorized boat rental concessions.** The proposed Shoreline Plan would limit new motorized boat rental concessions to within existing marinas, preserving more beach space for nonmotorized recreation (see Draft EIS page 2-38).
- ▲ **Allow nonmotorized storage racks.** The proposed Shoreline Plan would allow for storage racks for kayaks, paddleboards, and other nonmotorized watercraft. Storage racks would make it convenient and easier for recreationists to store and launch nonmotorized watercraft.
- ▲ **Increase boater education.** TRPA and partner organizations would provide increased education to motorized boat users, including education about the no-wake zone and boater safety. Education about lawful, safe, and appropriate boating behavior would occur at boat inspections, at rental concessions, and at popular access points (see Draft EIS page 2-37).

Some comments suggested additional elements to protect and enhance nonmotorized recreation. TRPA and the Shoreline Steering Committee reviewed these proposals and revised the proposed Shoreline Plan to include additional nonmotorized recreation elements. These additional elements are described in Chapter 2, “Revisions to the Proposed Shoreline Plan,” in this Final EIS and summarized below. Additional details on the implementation of these elements are provided in Appendix A, “Shoreline Implementation Program,” in this Final EIS. The following elements to protect and enhance nonmotorized recreation were added to the proposed Shoreline Plan after the public comment period on the Shoreline Plan and Draft EIS:

- ▲ **Establish a 100-foot no-wake buffer around swimmers and nonmotorized watercraft.** In addition to the 600-foot no-wake zone along the shoreline, TRPA would establish a 100-foot no-wake zone around swimmers and nonmotorized watercraft on the lake. This buffer, consistent with state laws, would reduce the risks of conflicts with motorized watercraft even if the swimmer or user of the nonmotorized watercraft was outside the 600-foot no-wake zone. This buffer would be enforced through the expanded multi-agency coordinated enforcement and education programs described above.
- ▲ **Establish a 200-foot no-wake zone around shoreline structures.** In addition to the 600-foot no-wake zone and the 100-foot no-wake buffer, TRPA would establish a 200-foot no-wake zone around all piers, buoys, and other structures. This buffer would reduce the risks of conflicts with motorized watercraft by providing a minimum of 200 feet of no-wake zone for nonmotorized navigation around all structures, regardless of the location of the structure. This no-wake zone would be enforced through the expanded enforcement and education programs described above.

- **Support the Lake Tahoe Water Trail.** TRPA would provide a portion of the education and outreach funds collected through the proposed Shoreline Plan to support paddler access and education programs of the Lake Tahoe Water Trail.
- **Conduct recreation monitoring and adaptive management.** TRPA would conduct regular recreation user satisfaction surveys to assess user satisfaction, including information on the quality of the recreation experience, crowding, and conflicts between user groups. This information could be collected in coordination with TRPA's recreation threshold monitoring or other recreation planning initiatives. TRPA would consider the results of this monitoring to determine whether plan or program changes are needed to protect and enhance nonmotorized recreation.

Nonmotorized watercraft access would not be limited by implementation of the proposed Shoreline Plan. Unlike motorized watercraft, nonmotorized watercraft do not rely on facilities for launching. Kayaks and paddleboards are routinely launched from locations other than formal access points, including virtually any stretch of publicly accessible shoreline. As discussed for Impact 8-4 on page 8-31 of the Draft EIS, "[t]he existing distribution of publicly owned property in the shorezone includes approximately 55 percent of the shoreline and privately owned includes approximately 45 percent (Table 8-2). None of the Shoreline Plan alternatives would directly change the amount of shoreline in public ownership." Because of the flexibility enjoyed by users of nonmotorized watercraft in accessing launch points from the shoreline, compared to the more limited access of users of motorized watercraft, and because more than half of the shoreline around Lake Tahoe is public land, implementation of the Shoreline Plan would not substantially impair nonmotorized boating. Other recreation plans and programs are in place to enhance nonmotorized recreation, and the proposed Shoreline Plan also includes such measures as appropriate to the plan's scope.

RECREATION PLANNING IN LAKE TAHOE

Recreation planning in the Lake Tahoe region is within the purview of TRPA and numerous federal, state, local, and private recreation providers. To provide a more comprehensive understanding of regional recreation planning relevant to the Shoreline Plan, this section summarizes the pattern of recreation land ownership, the TRPA Regional Plan Recreation Element, recreation provider plans, ongoing recreation planning initiatives, and the availability of shoreline recreation opportunities.

Pattern of Recreation Land Ownership

The Lake Tahoe Region is home to almost 55,000 full-time residents and is a recreational destination with four to six million visitors each year (TRPA 2017). The shoreline of Lake Tahoe includes private residential and public recreation areas and opportunities that reflect the mix of residents and tourists that enjoy the beaches and shoreline. Approximately 55 percent of the shoreline is in public ownership, most of which is available for public access to the lake (see Draft EIS pages 4-16 to 4-17). TRPA's Regional Plan and the multi-agency Environmental Improvement Program (EIP) promote the acquisition of lands for public access to Lake Tahoe. Public agencies, including the California Tahoe Conservancy (Conservancy), Nevada Division of State Lands, and U.S. Forest Service (USFS), have land acquisition programs to purchase suitable land and make it available to the public for dispersed recreation. Between 1996 and 2009, these agencies purchased more than 3,000 acres of land throughout the Tahoe Region (TRPA 2009). In 1983, less than 70 percent of the region was in public ownership (TRPA 1982). Today, approximately 90 percent of the region is public land (TRPA 2015).

The USFS, Lake Tahoe Basin Management Unit (LTBMU) manages approximately 27 percent of the shoreline. Public access and recreation are fundamental objectives of LTBMU for these shoreline areas, which include remote and dispersed shoreline access opportunities, as well as developed beaches and recreation sites (USFS 2016). The States of California and Nevada own and manage approximately 25 percent of the shoreline. Most of this land is managed for public access and recreation by California Department of Parks and Recreation (California State Parks), Nevada Division of State Parks (Nevada State Parks), and the California Tahoe Conservancy. These agencies also provide access to a variety of opportunities and recreation experiences ranging from secluded stretches of shoreline to developed

beaches and lakefront picnic areas. Approximately 3 percent of the shoreline is owned by local jurisdictions including counties, the City of South Lake Tahoe, public utility districts (in California) and general improvement districts (in Nevada). These agencies provide public lake access and facilities, including beaches, picnic areas, and nonmotorized access points. Much of the privately-owned portions of the shoreline are not open to the public, however substantial public access opportunities exist at privately owned facilities, such as marinas. In addition, a public trust easement between the low- and high-water elevation (elevation 6,228.75 Lake Tahoe datum LTD) exists along the entire California side of Lake Tahoe. This easement allows for public access and enjoyment of the shoreline within California.

TRPA Regional Plan Recreation Element

TRPA implements the Recreation Element of the Regional Plan to manage recreation and provide opportunities for high-quality recreation along the shoreline and throughout the region (TRPA 2012). The Recreation Element is guided by TRPA's recreation thresholds, which are environmental quality standards TRPA is mandated to monitor and maintain. These thresholds provide policy direction to preserve and enhance recreational experience and include directives to preserve high-quality undeveloped shorezone; provide for additional shorezone access, where lawful and feasible, for low-density recreational uses; and ensure a fair share of the region's capacity for recreation is available to the general public. The Recreation Element includes goals and policies that are implemented through the TRPA Code, the EIP, and the plans and programs of recreation providers. The most recent recreation threshold evaluation assessed data on recreation capacity, access opportunities, and user satisfaction surveys, and determined that "TRPA and other agencies are implementing actions that are effective at satisfying the intent of the adopted recreation policy..." (TRPA 2016:11-1).

The EIP Recreation Program is a primary strategy to implement the Recreation Element. It has focused on bringing additional acres of natural lands and miles of Tahoe's shoreline into public ownership and established new points of beach access, developed and retrofitted facilities, and created recreational trails. In the last 10 years (2008–2018), 36 recreation enhancement projects have been completed under the EIP Recreation Program, including 33 new recreation access facilities and two public acquisitions that added to the amount of shoreline in public ownership (TRPA 2018a).

Recreation Provider Plans

Agencies that provide recreation opportunities along the shoreline administer numerous plans and programs that promote high-quality recreation on and around lake. These plans and programs address recreation opportunities, facilities, and access for the full range of recreation activities and users in the region. Recreation planning and management of the shoreline are the purview of many organizations, including TRPA, USFS, California State Parks, Nevada State Parks, and the California Tahoe Conservancy. Tahoe Basin counties, the City of South Lake Tahoe, and other local public agencies, such as the Incline Village General Improvement District, North Tahoe Public Utility District, and Tahoe City Public Utility District, also manage public access points along the shoreline.

California State Parks manages lands within the state park system, including vast stretches of the shoreline in Emerald Bay State Park, Sugar Pine Point State Park, Kings Beach State Recreation Area, and D.L. Bliss State Park. The management of recreation in California state parks is guided by general plans for individual parks, the California State Parks Department Operations Manual, and other regulations and guidance that seek to achieve California State Parks' mission of providing for the health, inspiration, and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation. Each general plan includes a framework intended to guide day-to-day decision making and serve as the basis for developing focused feasibility and management plans, specific project plans, and other management actions. A revised general plan was recently prepared for the Kings Beach State Recreation Area, which is along the shoreline.

Nevada State Parks manages land within Lake Tahoe-Nevada State Park. Management of recreation in this park is guided by a general management plan that includes a long-range management and development strategy based on visitation, needs, and conditions, as well as projections for future use and needs (Nevada State Parks 1990). The *Lake Tahoe-Nevada State Park General Management Plan* is applicable to areas of the shoreline near Sand Harbor and Cave Rock, Spooner Lake, and the State Route 28 corridor.

The California Tahoe Conservancy Public Access and Recreation Program implements projects that provide public access to locations with regionally significant lakefront, riverfront, and cultural/historical and natural characteristics. It seeks to increase regional waterborne and nonmotorized transportation and recreation opportunities (Conservancy 2009). To support the program, the California Tahoe Conservancy allocates funds for projects it undertakes directly and for grants to eligible project sponsors, such as local governments or nonprofit organizations.

The Nevada Division of State Lands includes the Nevada Tahoe Resource Team Recreation Program, which develops and implements recreation projects in support of TRPA's Regional Plan and the Environmental Improvement Program (NDSL 2018). Elements of the Recreation Program include improving lake access and creating high-quality recreation experiences that maintain access to public lands while preserving sustainable recreational opportunities.

The USFS LTBMU Land Management Plan includes a recreation program strategy that provides for a range of recreation opportunities and considers changing trends and user needs while maintaining the natural setting (USFS 2016). The Land Management Plan identifies desired conditions for recreation opportunities, public access, and recreation development, such as providing a range of high-quality recreational opportunities and encouraging additional access to the shoreline. Desired conditions for recreation development also include meeting a wide range of social expectations while maintaining the quality of the setting and natural resources. USFS also implements the National Visitor Use Monitoring program, which surveys recreation visitors to the national forest system, including the Lake Tahoe Basin Management Unit. The National Visitor Use Monitoring program measures trends in user satisfaction and use levels, and the results assist recreation managers in making decisions that best serve the public and protect valuable natural resources by providing reliable, science-based information about the type, quantity, quality, and location of recreation use on public lands (USFS 2018).

The Lake Tahoe Water Trail follows the shoreline and connects approximately 40 public nonmotorized watercraft launch/landing sites (see Exhibits 8-1 and 8-2 on pages 8-8 and 8-9 of the Draft EIS) (Lake Tahoe Water Trail 2018a). The Lake Tahoe Water Trail provides opportunities for nonmotorized recreationists—kayakers and paddleboarders, in particular—to plan day trips between the different public launch and landing points or to plan multiday trips. As of June 2018, the Sierra Business Council has secured funding to complete the Lake Tahoe Water Trail signage system and mobile mapping water safety tool (Lake Tahoe Water Trail 2018b). The water trail signage and corresponding mobile mapping tool, with real-time weather and marine conditions, provides useful water safety and resource conservation tips and navigable paddle routes to access shoreline businesses, nearby hiking trails, historic sites, lodging, and campgrounds along the shoreline.

Ongoing Recreation Planning Initiatives

The Sustainable Recreation Collaborative, a multisector working group of conservation and recreation professionals, private and nonprofit partners, and recreation stakeholders, is developing a regionwide sustainable recreation strategic plan. This plan will integrate recreation planning throughout the Tahoe Region and include decision support tools, policies, management and funding strategies, project recommendations, and implementation measures to achieve a holistic recreation vision for Tahoe.

TRPA is implementing a strategic initiative to update its recreation thresholds and monitoring systems (TRPA 2018b). The TRPA Strategic Initiative Team is working with the new bistate Tahoe Science Advisory Council and science community to create a sustainable, prioritized, and relevant recreation monitoring plan and to review and consider modifying the recreation threshold standards to reflect current conditions, emerging

trends, and the latest science. Updated recreation thresholds would guide regional plans and programs to enhance and maintain the significant recreation values of the region.

Availability of Shoreline Recreation Opportunities

More than 40 public beaches and developed access points are located around Lake Tahoe (see Draft EIS Exhibits 8-1 and 8-2). Corresponding generally to the most populous residential and commercial centers around the lake, the highest concentrations of these public facilities are in Tahoe City, Tahoe Vista, Kings Beach, and the south shore between Emerald Bay and the state line. In addition, numerous opportunities for dispersed beach use and shoreline recreation are available. Approximately 12 miles of nearly continuous public shoreline are available in Lake Tahoe-Nevada State Park and along USFS lands that stretch along the east shore from Incline Village to Glenbrook. On the south and east shores, almost 12 miles of nearly continuous public shoreline extends from the west side of the Tahoe Keys, through Emerald Bay, and north to Rubicon Bay. These areas include developed beaches and public access points, as well as opportunities for dispersed recreation along the shoreline.

The Conservancy recently completed an inventory and assessment of public shoreline access opportunities (Conservancy 2018). This effort involved site-specific assessments of lakefront public lands, lake-view public lands, and lakefront private lands that provide public access and use on the California side of the lake. The inventory consists of an objective on-site review and documentation of observable public access facilities and any associated impediments to public access. This assessment noted that “[t]he primary and most important observation is that during our on-site review of lake access sites we noted no obstacles to access” (Conservancy 2018:7).

SHORELINE PLAN RECREATION IMPACT ANALYSIS

Several comments express concern about how an increase in shoreline structures and motorized boating under the proposed Shoreline Plan could affect the quality of the recreation experience. Their premise is that new structures and additional motorized boating could result in conflicts between nonmotorized recreation (e.g., paddlers and swimmers) and motorized boats or present navigational hazards to nonmotorized recreation. Specifically, comments questioned the boating density analysis in the Draft EIS, suggested the EIS should incorporate the WALROS system, and requested a more localized analysis of the recreation effects of the Shoreline Plan. To provide a thorough response to these comments, this section summarizes the Draft EIS analysis and provides additional analysis related to boating density, WALROS, and localized effects on recreation.

Boating Density Analysis

The Draft EIS evaluates whether implementing any of the Shoreline Plan alternatives would alter the quality of recreation experiences or create user conflicts (see pages 8-11 through 8-24). As part of this analysis, changes in the density of motorized boats on the lake during a peak day (i.e., Independence Day or Labor Day weekends) were estimated for each alternative (see Draft EIS Table 8-3 on page 8-13). Some comments assert that the Draft EIS relies solely on the estimates of lakewide boat density to assess effects on user conflicts and the quality of the recreation experience. Other comments note that boat use is not evenly distributed around the lake and suggest that the boat density analysis should assume that most boat use occurs close to shore.

A change in boat density is only one of several metrics used to assess potential effects on the quality of recreation experiences and recreation user conflicts. The Draft EIS also evaluates the general location of new shoreline structures and determines that, based on the distribution of private land and parcels potentially eligible for new piers, most new structures would be located in areas with existing shoreline development. Thus, structures allowed under the proposed Shoreline Plan would not change the character of areas experienced by recreationists because they would be located in areas where recreationists already experience substantial shoreline development, and only a limited number of public structures would be located in areas that do not already contain substantial shoreline development (Draft EIS page 8-12).

The Draft EIS also includes a detailed evaluation of design and location standards proposed under each alternative to assess effects on recreation. The analysis determines that the standards in the proposed Shoreline Plan would maintain opportunities for nonmotorized navigation and beach access (Draft EIS pages 8-14 and 8-29). The evaluation of effects on the quality of the recreation experience also incorporates the scenic analysis because changes in scenic views would affect the quality of the recreation experience (Draft EIS pages 9-19 through 9-69). In addition, the assessment of potential user conflicts incorporates an analysis of increased boating and navigational hazards based on accident data (Draft EIS pages 15-16 through 15-20).

The Draft EIS also considers the patterns of recreation, noting that the lake provides a variety of recreation experiences varying from popular destinations with heavy use to less crowded areas that offer quieter experiences. Because of the relatively small increase in boat density, the large size of the lake, and the diverse range of recreation experiences that would be available, the proposed Shoreline Plan would maintain this range of recreation opportunities (Draft EIS page 8-13). Lakewide peak summer day boating density estimates provide a reasonable comparison of the relative amount of crowding that could occur under each alternative during the busiest periods for recreation (see Draft EIS page 8-13). The analysis notes that under the proposed Shoreline Plan, boat density on peak summer days would increase, but the relative increase in density would not be substantial enough to be noticeable on those peak summer days or result in a substantial increase in user conflicts. Contrary to assertions in comments, the analysis recognizes that, in practice, additional boats on the lake would not be evenly spaced at the densities shown in Table 8-3. The Draft EIS summarizes the boat density conclusions as follows (Draft EIS page 8-13):

[U]sers of motorized watercraft would likely follow existing patterns of travel to popular destinations around the lake, including Baldwin Beach, east shore beaches, and many of the state parks such as Emerald Bay and Sand Harbor, and public beaches along the south shore. Because of the relatively small increase in boat density (11.5 percent on a peak day) and because motorized recreation users would congregate near existing popular destinations along the shoreline, the increase in motorized recreation with Alternative 1 would not be substantial enough to be noticeable by recreation users on the lake and in the shorezone such that the quality of recreation experience would be degraded. The increase in motorized watercraft would not change the character of the experience in areas that already experience overcrowding.

As requested in comments, the analysis here expands on the lakewide boat density analysis presented for Impact 8-1 in the Draft EIS, recognizing that much of the boating activity occurs in areas closer to shore. Table 3-1, below, presents the relative boat density that could be expected if all boating occurred within 2 miles and within 1 mile of shore. Compared to the lakewide density, the density of boats on a peak day increases when smaller areas of the lake are considered; however, the percent increase in density under each alternative compared to baseline conditions does not change from what is described for Impact 8-1 in the Draft EIS. For the proposed Shoreline Plan, boat density on a peak day would increase by 11.5 percent, regardless of whether the analysis assumes boats are distributed evenly across the lake or congregated near the shoreline.

Using the scenario in which all boats are clustered within 1 mile of the shore and assuming—for the sake of analysis—a 1-square-mile sample area, a total of 84 boats would occupy that space on a peak summer day under baseline conditions and would be about 660 feet apart if they were evenly distributed within the sample area. Under Alternative 1, the total would be 94 boats in that same square mile, and they would be 587 feet apart, 73 feet closer (perhaps three boat lengths closer) over a distance of approximately 29 boat lengths (assuming a 23-foot-long powerboat).

Table 3-1 Changes in Density of Boats on the Lake on a Peak Day at Buildout

	Peak Day Boat Trips ¹	Existing Plus Project Peak Day ¹	Lakewide Boat Density ² (acres/boat)	2-Mile Shoreline Buffer Boat Density ² (acres/boat)	1-Mile Shoreline Buffer Boat Density ² (acres/boat)
Baseline Conditions	5,899	N/A	20.8	15.3	7.6
Alternative 1	+767	6,666	18.4	13.5	6.8
Alternative 2	+2,639	8,537	14.4	10.5	5.3
Alternative 3	+222	6,121	20.1	14.7	7.4
Alternative 4	+0	5,899	20.8	15.3	7.6

Note: N/A = not applicable.

¹ Peak day boat trips were obtained from Table 2-3 in Chapter 2, "Description of Proposed Project and Alternatives," of the Draft EIS.

² The surface area of Lake Tahoe is approximately 122,880 acres. The surface area within 2 miles of the high-water line elevation is 90,017 acres. The surface area within 1 mile of the high-water line elevation is approximately 45,050 acres. The boating densities presented here are rounded.

Source: Compiled by Ascent Environmental in 2018

Using the scenario in which all boats are clustered within 2 miles of shore, the same calculations for a 4-square-mile sample area (2 miles by 2 miles) yields 167 boats 880 feet apart for baseline conditions, and about 190 boats approximately 812 feet apart under the proposed Shoreline Plan. Boats would be 68 feet closer together (approximately 3 boat lengths) over a distance of about 38 boat lengths. These estimates are conservative and overestimate the density of boats that would occur on Lake Tahoe because (1) these estimates are for a peak summer day and not an average day during the boating season, (2) these estimates assume that all boats that access the lake at some point during a peak summer day would be on the lake at the same time, and (3) it is unrealistic to believe that all boats would remain clustered within 1 or 2 miles of shore.

Given the ample lake surface, which provides a range of different recreation experiences, and the modest increase in boat density, which would occur gradually over the long-term planning horizon, the increase in boats would not be noticeable to the average person recreating on Lake Tahoe. For these reasons, the density analysis in the Draft EIS is appropriate as presented.

Under existing conditions, recreation experiences on the lake can greatly vary depending on the season, day of the week, and time of day. Weekdays, early mornings, spring days, and fall days can provide opportunities for a more serene experience with fewer boats. These quiet, solitary experiences are already limited during peak periods, and it would not be reasonable to expect such experiences during those peak times in the future, even with no increase in boating. Implementation of the proposed Shoreline Plan could increase the number of motorized boats on the lake during off-peak times when quiet, solitary experiences are available. However, the increase in boat density would be small during these periods. For example, the amount of boat use that associated with a buoy on a weekend outside of the peak summer season is less than half the amount associated with a buoy during a peak season weekend. Similarly, the amount of boat use associated with a boat slip during a weekend in the off-peak season is about 8 percent of the boat use attributed to that same slip during a peak season weekend (Draft EIS Appendix A:3). Thus, opportunities for quiet, solitary experiences would remain during the same time periods that they are currently available.

In addition, the proposed Shoreline Plan has been revised to add a 100-foot no-wake buffer around swimmers and users of nonmotorized watercraft, an additional 200-foot no-wake zone around structures, and recreation monitoring and adaptive management, as described above. These changes would reduce the potential for the proposed Shoreline Plan to degrade the quality of recreation experiences or result in user conflicts. Therefore, the potential impacts of the revised proposed Shoreline Plan would be less than that presented for Impact 8-1 in the Draft EIS.

Water and Land Recreation Opportunity Spectrum

Several comments correctly note that the effects of the Shoreline Plan alternatives on recreation would vary by location, and some comments request that the EIS address localized conditions at individual areas around the shoreline. Some further suggest that the EIS should characterize recreation use based on the WALROS system (Reclamation 2011) as applied in *Reservoir Boating*, a recreation study to support the Oroville Facilities Relicensing (California Department of Water Resources 2004).

The WALROS tool is used to understand the type and location of six categories of water-related recreation opportunities, otherwise known as WALROS classes: urban, suburban, rural developed, rural natural, semi-primitive, and primitive (Reclamation 2011:ix). A particular “package” of activities, setting attributes, experiences, and benefits defines each WALROS class. The WALROS tool provides land, water, and recreation planners and managers with a framework for making informed decisions to conserve a spectrum of high-quality and diverse water and land recreation opportunities.

Table 3-2 summarizes the WALROS method: characteristics of recreation experiences and recreation user expectations for the six recreation opportunity settings. These WALROS descriptions are intended to be used as approximate guidance that is tailored to the specific recreation resource area being assessed. The WALROS system is not well-suited or well-tailored to Lake Tahoe’s circumstances. These classes consider both the physical setting (e.g., the level of shoreline development), and the social setting (e.g., amount and types of recreational use) and correlate one with the other within each recreation opportunity setting. These classes have limited value for characterizing recreation opportunities at Lake Tahoe because the physical and social setting correlates at Oroville Reservoir are diametrically different than how those factors correlate at Lake Tahoe. Consequently, the WALROS opportunity settings do not represent Lake Tahoe or its array of recreation experiences. More specifically, the number of users, types of activities, and density of boats vary substantially at Lake Tahoe, a seasonal vacation destination, depending on the day of the week, season, and time of day. Thus, the social setting at Lake Tahoe varies substantially depending on the season, day of the week, and time of day. As a result, the social setting categories used in WALROS classifications do not reflect the range of recreation experiences available at Lake Tahoe. Because of the strict development limitations and the heavy visitation at Lake Tahoe, the physical setting and social setting tend to diverge. For example, many undeveloped sections of the shoreline receive heavy visitation during peak periods. In these areas, the physical setting (i.e., amount and type of development) would reflect a less-developed WALROS class, whereas the social setting (i.e., number of visitors) would reflect a more developed class. In sum, the six WALROS settings do not describe the high variability of experiences available at Lake Tahoe, and it is not an appropriate system of analysis for use in evaluating recreation effects of the Shoreline Plan alternatives.

Table 3-2 Water and Land Recreation Opportunity Spectrum Setting Descriptions

Setting Type	Description of Experience Characteristics and Recreation User Expectations
Urban	<p>There are very limited opportunities to see, hear, or smell the natural resources (e.g., forests, wildlife, aesthetics). Watching and meeting other visitors are expected and desired, and large group activities, such as guided fishing and tour boat sightseeing, are popular.</p> <p>Socializing with large groups, family, and friends is important.</p> <p>A high sense of safety, security, comfort, and convenience is central and dominant.</p> <p>The mix of recreation activities is diverse, ranges from relaxation and contemplation (e.g., sunbathing, reading, nature walking) to physical exertion and excitement (e.g., parasailing, jet boating, water skiing).</p> <p>The area may serve as a transportation corridor for transient visitors or as a staging area for others traveling to nonurban settings.</p>
Suburban	<p>There are limited opportunities to see, hear, or smell the natural resources.</p> <p>Watching and meeting other visitors are expected and desired.</p> <p>Socializing with family and friends is also important and large groups and families are common.</p> <p>A high sense of safety, security, comfort, and convenience is central and dominant.</p> <p>The mix of recreation activities may be diverse, ranging from relaxation and contemplation to physical exertion, thrills, excitement, and challenge.</p> <p>Learning about natural or cultural history, ecology, and reservoir and river operations is important to some people.</p>

Table 3-2 Water and Land Recreation Opportunity Spectrum Setting Descriptions

Setting Type	Description of Experience Characteristics and Recreation User Expectations
Rural Developed	<p>There are occasional or periodic opportunities to see, hear, or smell the natural resources.</p> <p>Development, human activity, and natural resource modifications are common and frequently encountered.</p> <p>The opportunity to experience brief periods of solitude is important but changes from day to day.</p> <p>The presence of other visitors is expected.</p> <p>A sense of safety and security is important.</p> <p>Recreation activities may be diverse, ranging from relaxation and contemplation (e.g., sunbathing, sailboating, shoreline fishing) to physical exertion and challenge (e.g., competing in shoreline and water sports, tournament fishing, water skiing, and kayaking).</p>
Rural Natural	<p>Opportunities to see, hear, or smell the natural resources without human activity and natural resource modifications are only occasional and infrequent.</p> <p>The setting is noticeably more natural, less developed, and more tranquil than an urban setting.</p> <p>Socialization is not very important, although the presence of others is expected.</p> <p>The opportunity to relieve stress and get away from an infrastructure environment is important; a high sense of safety, security, comfort, and convenience is not important or expected.</p> <p>A sense of independence, freedom, and tranquility is also important.</p> <p>Experiences tend to be more resource dependent and diverse and may include relaxation and contemplation (e.g., sunbathing, canoeing, sailing, boat fishing). Activities could also include socialization and physical exertion (e.g., kayaking, waterskiing).</p>
Semi-Primitive	<p>There are widespread and prevalent opportunities to see, hear, or smell the natural resources.</p> <p>Development, human activity, and natural resource modifications are seldom encountered.</p> <p>The opportunity to experience a natural ecosystem with little human imprint, a sense of challenge, an adventure, a risk, a sense of self-reliance, and a feeling of solitude is important.</p> <p>A sense of independence, freedom, tranquility, relaxation, appreciation of nature, and stewardship is typical.</p> <p>More trip planning, more preparation, a travel distance of one or more days, more physical effort, and a longer duration visit are required.</p> <p>The semi-primitive area provides opportunities for the more adventure-based enthusiast (e.g., fly-fishing, backcountry camping, canoeing, rafting, and nature viewing).</p>
Primitive	<p>There are many opportunities to see, hear, or smell the natural resources.</p> <p>Development, human activity, and natural resource modifications are rare.</p> <p>The opportunity to experience natural ecosystems with very little and no apparent human imprint is paramount. The natural views, sounds, and smells dominate the area.</p> <p>A sense of solitude, peacefulness, tranquility, challenge, adventure, risk, and self-reliance is highly important, as is the lack of sight, sound, and smells of other humans.</p> <p>There are opportunities for human-powered activities, such as canoeing, kayaking, fly-fishing, and backpacking.</p> <p>Visitation often requires considerable trip planning, more travel, physical exertion, and a longer duration visit.</p>

Source: Reclamation 2011

Localized Effects on Recreation

The Draft EIS includes a description of existing recreation facilities; public access points; shoreline structures; and motorized and nonmotorized recreation use, including areas with user conflicts (see pages 8-7 through 8-11). It does not provide quantitative estimates of changes in boating activity within specific portions of the lake because (1) no quantitative data on boating use patterns or localized boat use densities are available, (2) it is not possible to know the location of future access structures (e.g., public boat ramps) that could affect the distribution of boating, and (3) boats are highly mobile so future changes in localized use patterns would be more affected by individual boater adaptations and preferences than by the distribution of access structures authorized by the Shoreline Plan. It is also not necessary to quantify the density of boats within local areas to understand the programmatic effects of the Shoreline Plan, which is a long-term plan covering a broad geography (see Draft EIS page 1-3).

Nevertheless, in response to comments, the discussion below expands on the analysis provided in the Draft EIS to further evaluate recreation activity along different segments of the shoreline. It relates the characteristics of the recreation opportunities on Lake Tahoe to the recreation opportunity classes that

make up the WALROS system, a modified WALROS analysis applied to the characteristics of Lake Tahoe. This additional analysis divides the shoreline into nine different segments, each of which represents areas of the shoreline with similar recreational characteristics. The nine segments were selected based on consideration of (1) public versus private land ownership (see Draft EIS Exhibit 4-6), (2) shoreline character types (see Draft EIS Exhibit 2-4), (3) day trips identified by the Lake Tahoe Water Trail (Lake Tahoe Water Trail 2018a), and (4) the distribution of shoreline access facilities (see Draft EIS Exhibits 8-1 and 8-2). The locations of the segments are shown in Exhibit 3-1. A qualitative analysis of each shoreline segment is provided below, including a description of use patterns, applicable WALROS classifications for physical settings, a characterization of the existing and future level of development, and an assessment of effects on nonmotorized navigation. Recreation facilities, existing piers and buoys, parcels eligible for a new pier, and no-wake zones within each shoreline segment are shown in Exhibits 3-2 through 3-10. The more localized analysis, below, reveals that none of the nine shoreline segment's WALROS classifications change to a more developed class as a result of buildout of the proposed Shoreline Plan.

Tahoe City Area (Exhibit 3-2)

Recreation opportunities in the shoreline segment near Tahoe City include a variety of access sites and facilities, including two marinas, three public boat launches, seven formal nonmotorized launch sites, and several publicly accessible beaches (Exhibit 3-2). However, due to the high percentage of private land along the shore in this segment, there is a limited amount of public shoreline access, such as beaches, in this area. This portion of the lake's shoreline is dominated by privately owned land and is characterized by commercial and residential development and other structures that are interspersed with considerable vegetation. High concentrations of piers and buoys, including buoy fields, are associated with private parcels located along the shoreline in this area (Exhibit 3-2). The existing physical setting reflects the suburban or rural developed WALROS class, with pockets of more intensive development similar to development in the urban class. As shown in Exhibit 3-2, parcels eligible for a new private pier are generally located between Sunnyside and Tahoe City and between Tahoe City and Dollar Point, and new buoys could be located adjacent to private land throughout much of this segment. Development of these new structures and the redevelopment of existing structures would not alter the character of the existing suburban, urban, or rural developed physical setting, because added new structures would be limited and similar to existing structures and because this area already contains a substantial amount of shoreline development.

The recreation experience in this segment varies substantially based on the time of day, day of the week, and season. On a peak summer day, popular shoreline destinations in this area, such as Commons Beach, experience high visitation and a great number of nonmotorized and motorized watercraft in the water. Common travel routes for swimmers and users of nonmotorized watercraft in this area are generally along the shore, where users may experience high levels of motorized and nonmotorized use during some periods. Nonmotorized travel routes tend to be landward of large buoy fields near Tahoe City and lakeward of shoreline development in other areas, such as McKinney Bay and north of Dollar Point (Exhibit 3-2). The proposed Shoreline Plan would not alter these travel routes, because it would provide expanded no-wake zones with increased enforcement, would not allow for new buoy fields, would limit pier lengths, and would require space sufficient to allow navigation around or between buoys. Overall, the nonmotorized recreation experience in this area would not substantially change, because the physical character of the area would not change, nonmotorized travel routes would not change, and the increase in motorized boating activity would be limited (11.5 percent on a peak day) and would occur gradually over the 20-year buildout period of the Shoreline Plan.

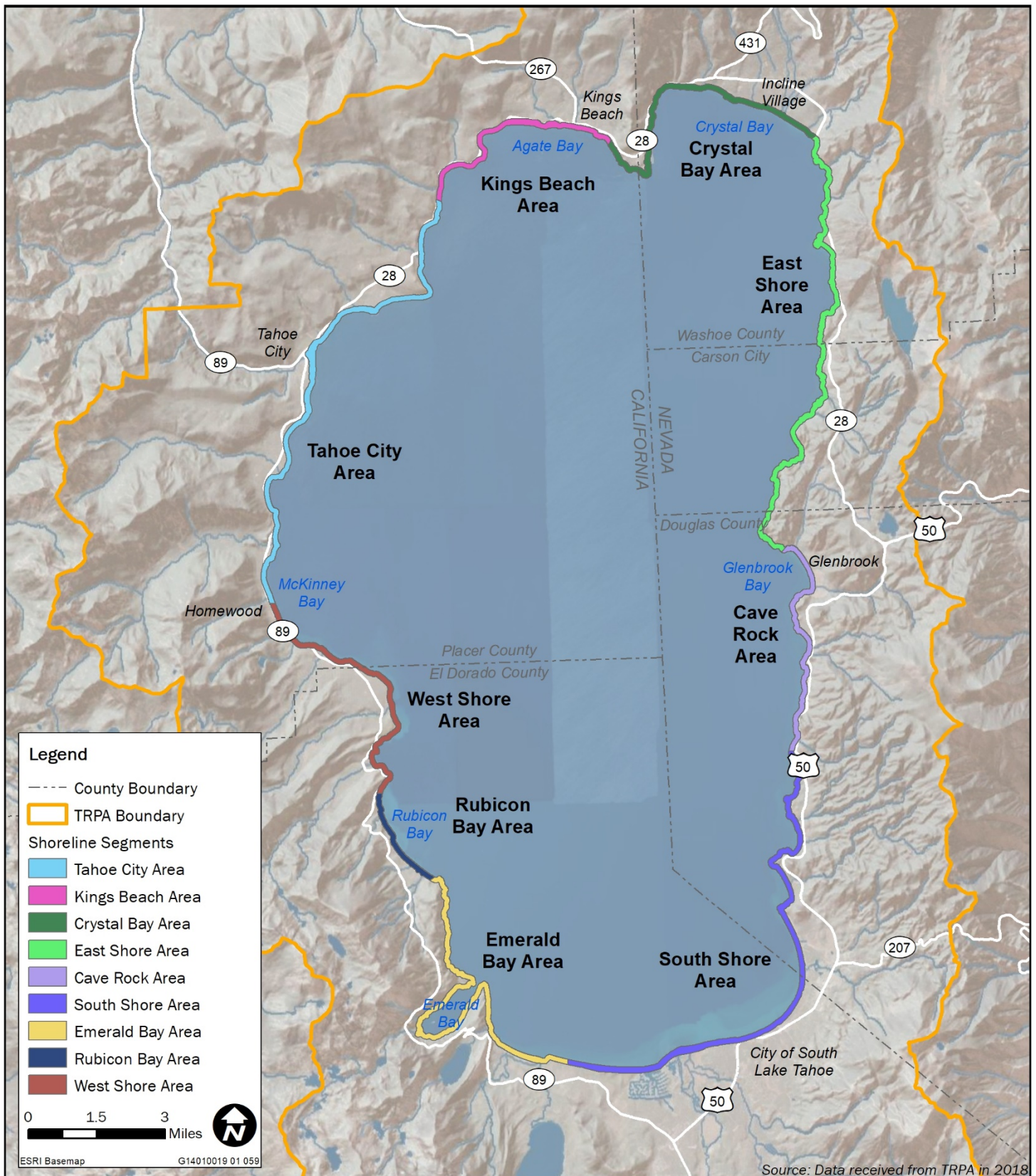
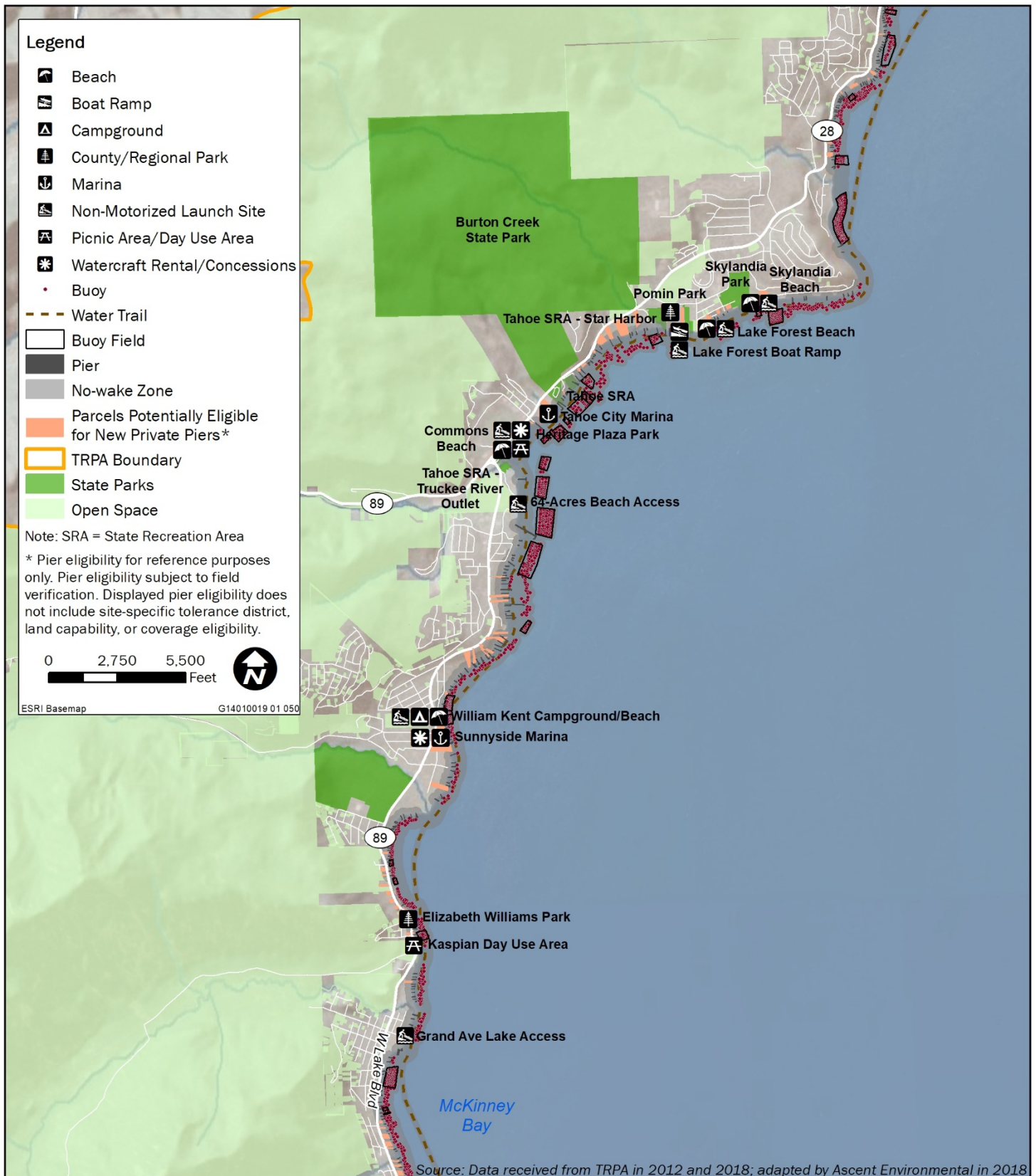


Exhibit 3-1 Shoreline Recreation Segments







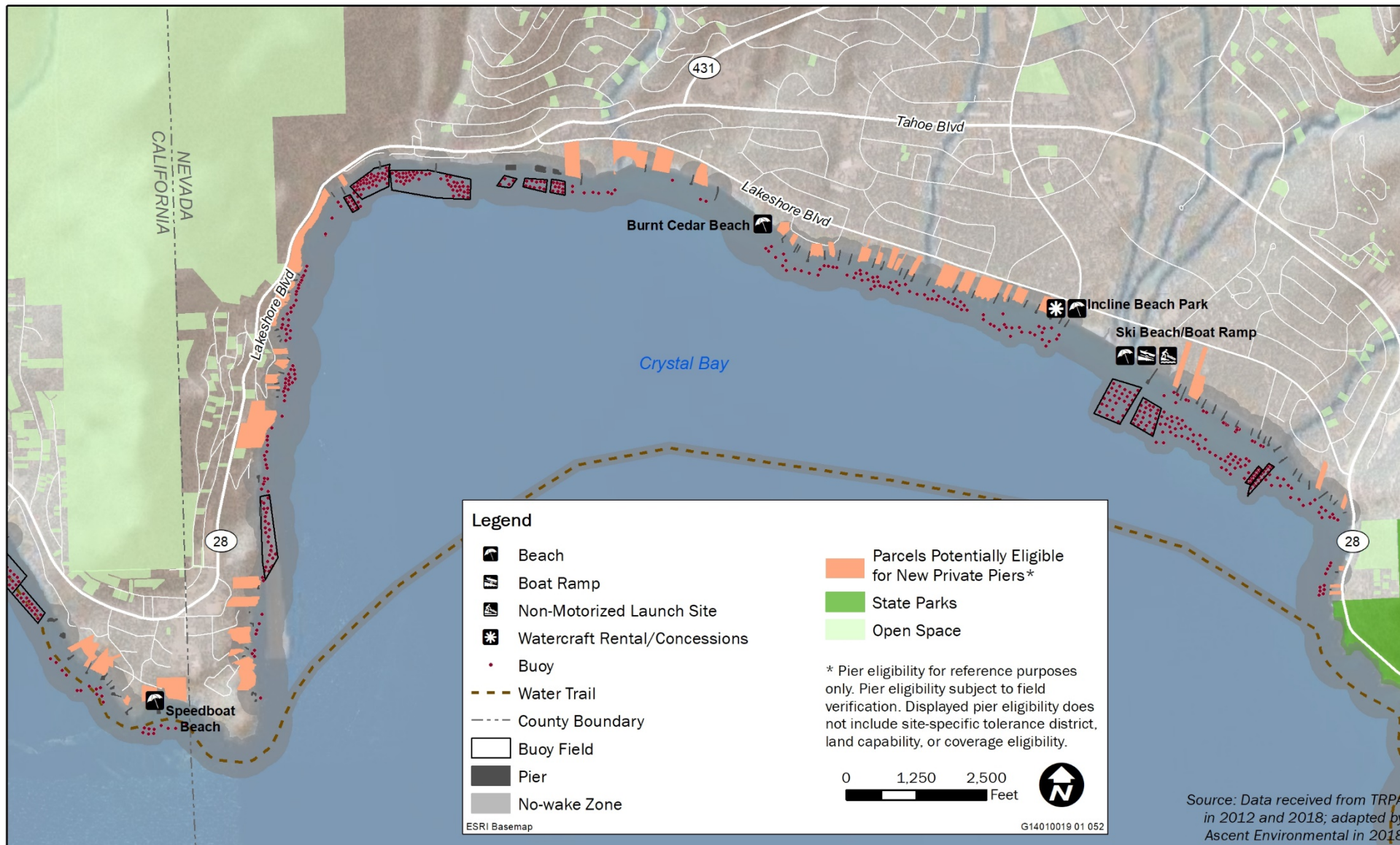
Source: Data received from TRPA in 2012 and 2018; adapted by Ascent Environmental in 2018



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Exhibit 3-3 Kings Beach Area - Shoreline Structures and No-Wake Zones

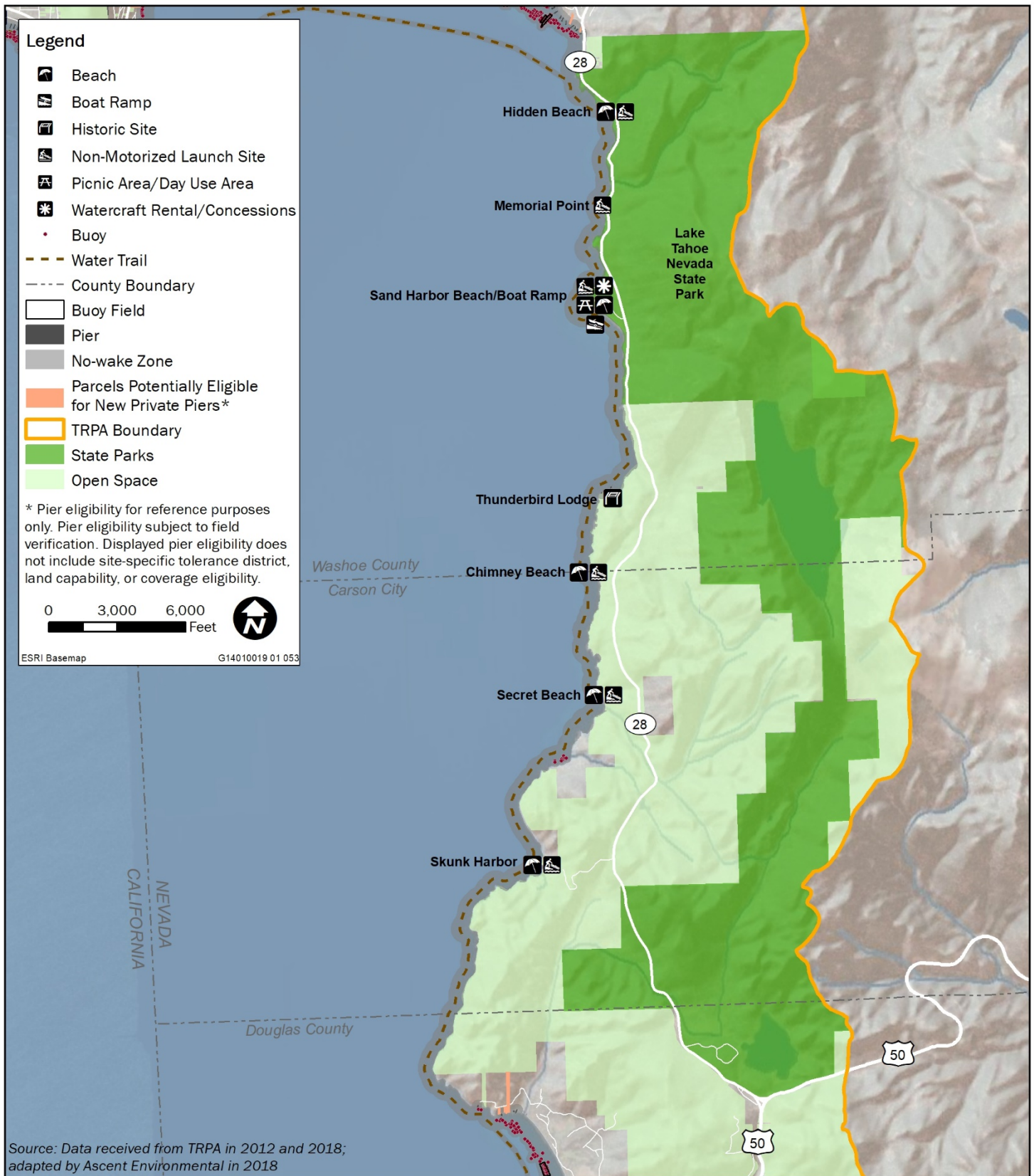




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Exhibit 3-4 Crystal Bay Area - Shoreline Structures and No-Wake Zones



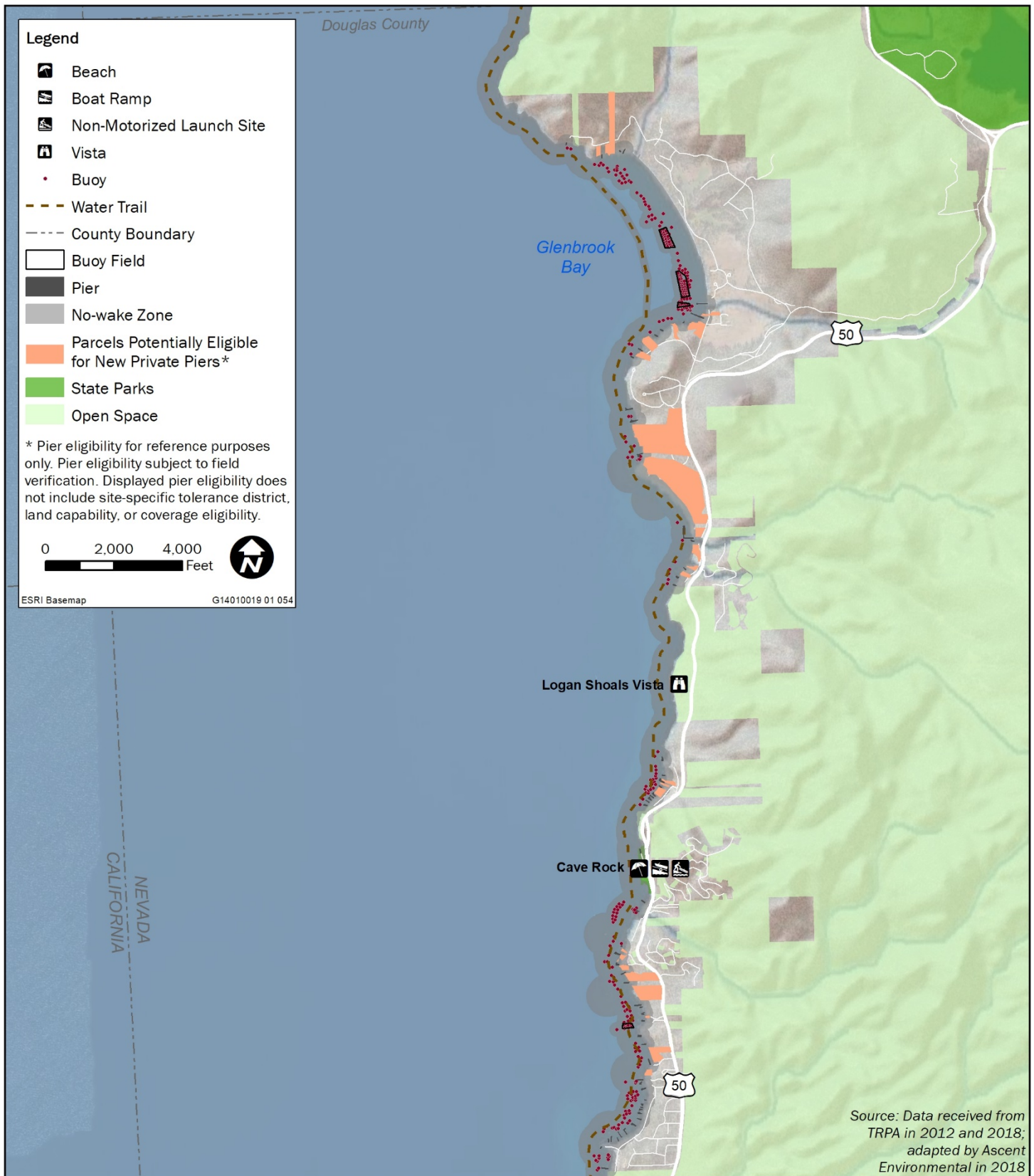


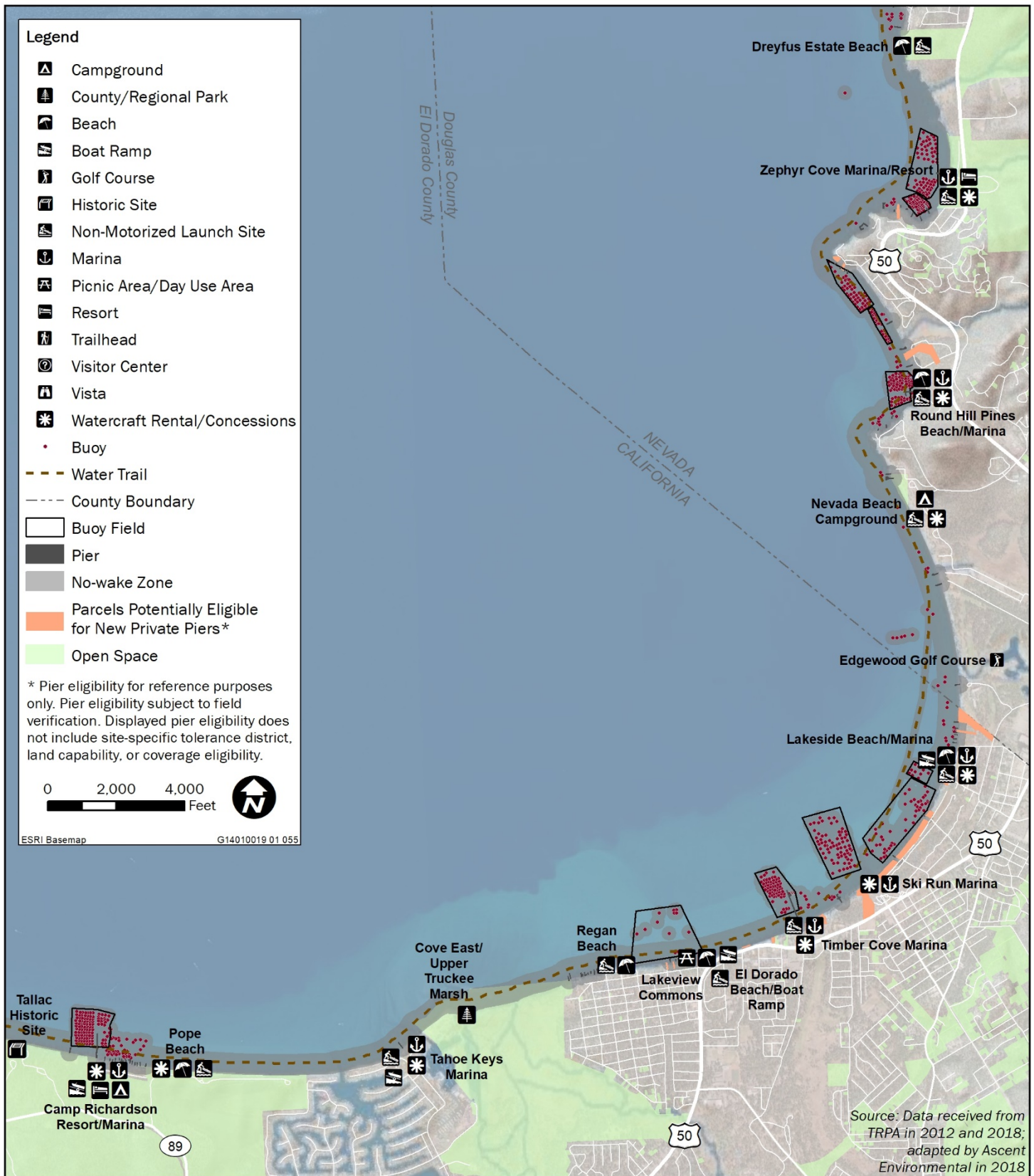
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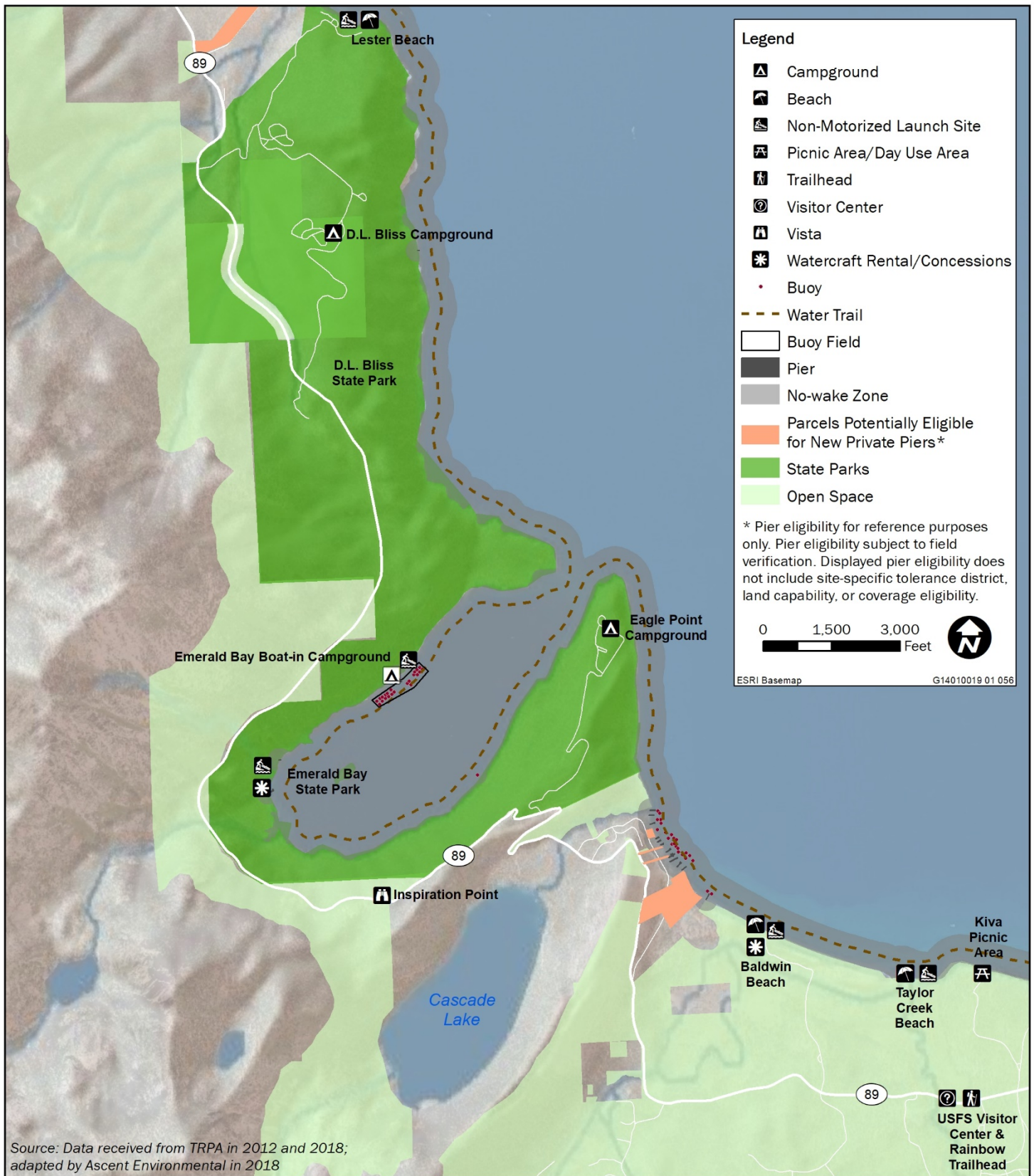
Exhibit 3-5

**East Shore Area - Shoreline Structures
and No-Wake Zones**







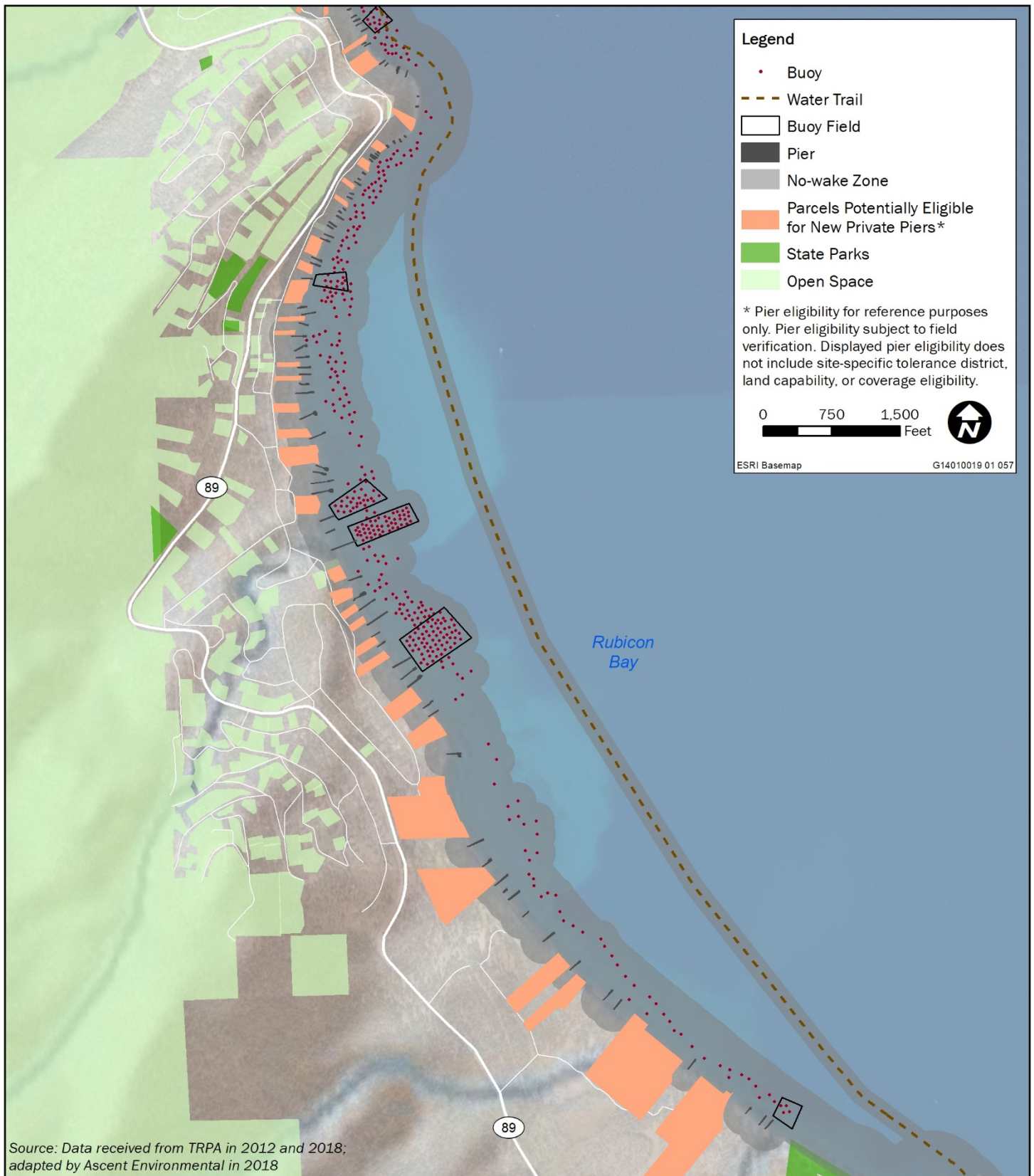


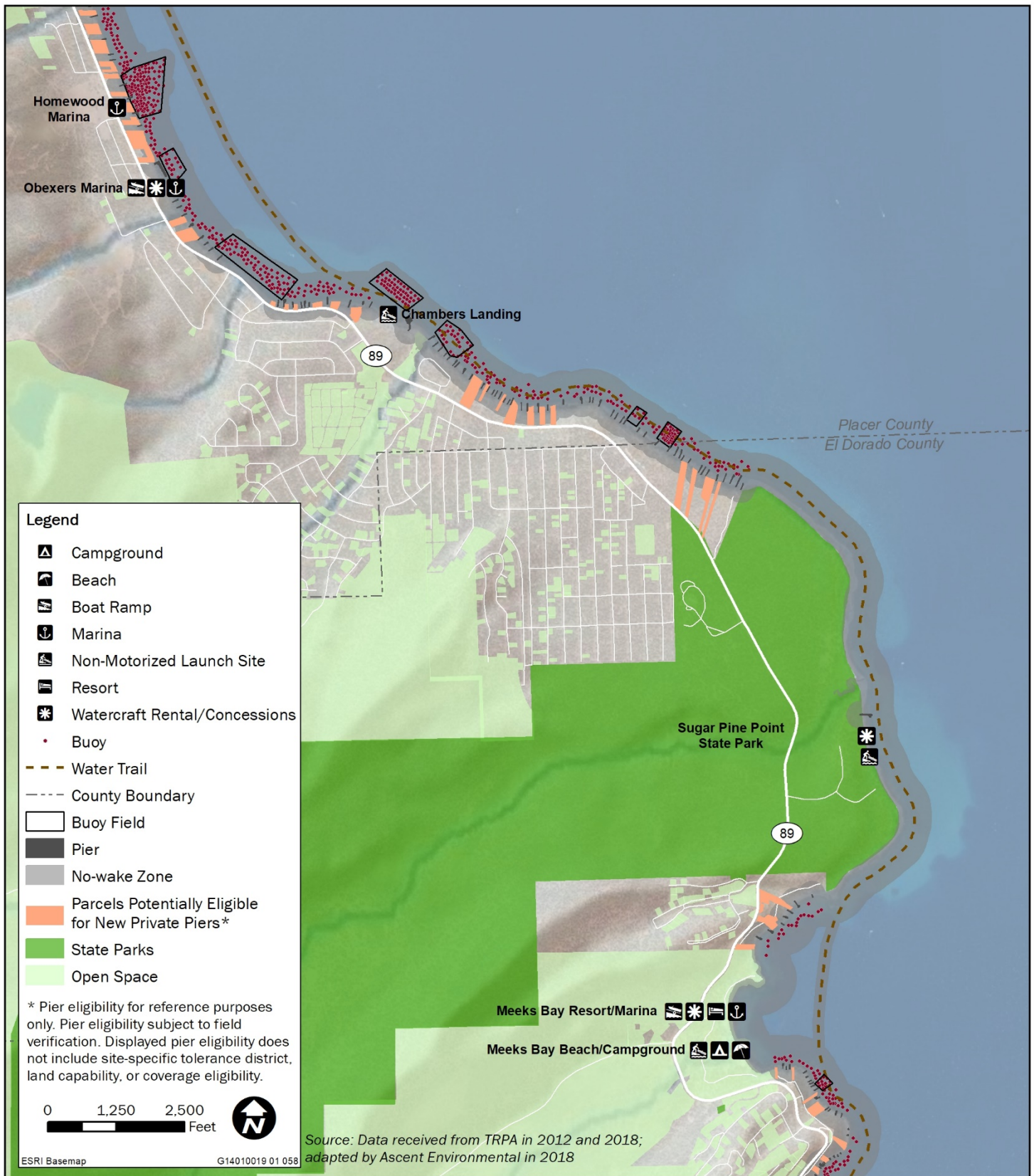
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Exhibit 3-8

**Emerald Bay Area - Shoreline Structures
and No-Wake Zones**







Kings Beach Area (Exhibit 3-3)

Recreation opportunities in the shoreline segment near Kings Beach include a cluster of five public access beaches, two public boat ramps, and two marinas (Exhibit 3-3). This area contains a high level of development near the shoreline, including several resorts and other private development. There is a high concentration of piers and buoys serving marinas, public recreation areas, and private parcels in the area between Tahoe Vista and Carnelian Bay. Kings Beach State Recreation Area is very popular during summer peak periods, with greater beach use and more nonmotorized and motorized watercraft than are found in other portions of this segment. The existing physical setting reflects the rural developed WALROS class, with pockets of more intensive development similar to development in the suburban class. As shown in Exhibit 3-3, parcels eligible for a new private pier are generally located along the western side of Agate Bay and along Carnelian Bay, and new buoys could be located adjacent to private land in much of this segment. Development of these new structures and the redevelopment of existing structures would not alter the character of the existing rural developed physical setting, because added new structures would be limited and similar to existing structures and because this area already contains a substantial amount of shoreline development.

As with the Tahoe City segment, the recreation experience in this segment varies substantially. Common travel routes for swimmers and users of nonmotorized watercraft in this area are generally along the shore, where users may experience high levels of motorized and nonmotorized activity during some periods. Nonmotorized travel routes tend to be landward of large buoy fields near Tahoe Vista and Kings Beach and lakeward of shoreline development in other areas (Exhibit 3-3). The location standards in the proposed Shoreline Plan would not alter these travel routes, because the plan would provide expanded no-wake zones with increased enforcement, would not allow for new buoy fields, would limit pier lengths, and would require space sufficient to allow navigation around or between buoys. Overall, the nonmotorized recreation experience in this area would not substantially change because the physical character of the area would not change, nonmotorized travel routes would not change, and the increase in motorized boating activity would be limited (11.5 percent on a peak day) and would occur gradually over the 20-year buildout period of the Shoreline Plan.

Crystal Bay Area (Exhibit 3-4)

Public recreation opportunities in the Crystal Bay area, including Incline Village, are very limited. Several beaches within Incline Village are quasi-public, in that they are available to Incline Village General Improvement District passholders and their guests (Exhibit 3-4). The only open publicly accessible beach in this area is the small Speedboat Beach, located in Brockway. The shoreline in this area includes many private residences and a high concentration of piers and buoys near Incline Village. The shoreline along Crystal Bay is characterized by fewer piers than are present near Incline Village. The existing physical setting reflects the rural developed WALROS class, with areas near Incline Village that are more similar to the suburban class. Although many parcels are potentially eligible for new private piers, the number of new piers under the proposed Shoreline Plan would be limited by distribution standards that allow only up to 21 new piers within the more than 12 miles of shoreline in Washoe County (an approximately 25-percent increase in the number of piers in the county). New buoys could be added to existing buoy fields and adjacent to individual parcels in much of this segment. Development of these new structures and the redevelopment of existing structures would not alter the character of the existing rural developed or suburban physical setting, because the added structures would be limited and similar to existing structures and because this area already contains a substantial amount of shoreline development.

As with other segments, the recreation experience in this segment varies substantially. Common travel routes for swimmers and users of nonmotorized watercraft in this area are typically far from shore because of the limited opportunities to stop at public beaches and landing spots; or nonmotorized recreation is clustered around individual beaches and private residences. The location standards and number of structures authorized under the proposed Shoreline Plan would not alter these travel routes, because the travel routes tend to be far from shore, where they would not be affected by shoreline structures, and because the proposed Shoreline Plan would provide expanded no-wake zones with increased enforcement, would not allow for new buoy fields, would limit pier lengths, and would require space sufficient to allow navigation around or between buoys. Overall, the nonmotorized recreation experience in this area would not

substantially change, because the physical character of the area would not change, nonmotorized travel routes would not change, and the increase in motorized boating activity would be limited (11.5 percent on a peak day) and would occur gradually over the 20-year buildout period of the Shoreline Plan.

East Shore Area (Exhibit 3-5)

Almost all the shoreline along the east shore segment is USFS land or public land within the Lake Tahoe-Nevada State Park. Recreation opportunities in this area include several scenic beaches that are accessed either by traveling by motorized or nonmotorized watercraft from the lake or by parking on State Route 28 and walking to the beach (Exhibit 3-5). Because the east shore is primarily public land, the shoreline in this area is dominated by natural features and vegetation with historic sites remaining in a few places, including Thunderbird Lodge and the Newhall House at Skunk Harbor. Despite the limited access to the east shore from the land, beaches on the east shore have high visitation on peak summer days from recreationists traveling on foot and on motorized and nonmotorized boats. This area also includes Sand Harbor, which provides a boat ramp for launching motorized and nonmotorized watercraft. Sand Harbor is very popular during summer, with the parking areas, including those for visitors launching motorized and nonmotorized boats, reaching capacity early in the morning. The existing physical setting reflects the semi-primitive WALROS class. The proposed Shoreline Plan designates almost the entire area within this segment as a Shoreline Preservation Area (see Draft EIS Exhibit 2-12). No or very few new private shoreline structures would be expected in this segment under the proposed Shoreline Plan, and the semi-primitive physical setting would not change.

As with other segments, the recreation experience in this segment varies substantially. It often reflects the semi-primitive WALROS class because of the dispersed nature of beach and water recreation in this area. However, during busy summer weekends, the setting can become substantially more crowded as many visitors make east shore beaches their destination. Because no or very few new private structures would be constructed under the Shoreline Plan, nonmotorized travel patterns would not change in this segment. Overall, the nonmotorized recreation experience in this area would not substantially change, because there would be no or very few new shoreline structures and because the increase in motorized boating activity would be limited (11.5 percent on a peak day) and would occur gradually over the 20-year buildout period of the Shoreline Plan.

Cave Rock Area (Exhibit 3-6)

Recreation opportunities along the Cave Rock segment are somewhat limited because, with the exception of the Cave Rock boat launch, there is very little public access from the land (Exhibit 3-6). The boat launch is used for both motorized and nonmotorized watercraft. Nonmotorized watercraft recreationists launch at this point for day trips along the shoreline to the north and south. A small public beach is also located at the south end of the parking lot. In the Cave Rock area, the areas north and south of the public boat launch and beach are characterized by private homes interspersed with vegetated areas. A high concentration of buoys and some piers are located in the Glenbrook, Lakeridge, and Skyland residential areas. The overall physical setting reflects the rural developed WALROS class. Some areas (such as near Logan Shoals) contain less development and exhibit characteristics of the rural natural class. More than 20 parcels are potentially eligible for new private piers in this segment, all of which would be located in areas with existing shoreline development (Exhibit 3-6). Similarly, new buoys could be placed adjacent to private parcels, most of which already contain shoreline structures. Development of these new structures and the redevelopment of existing structures would not alter the character of the existing rural developed physical setting, because added new structures would be limited and similar to existing structures and because this area already contains a substantial amount of shoreline development.

Like other areas of the lake, the recreation experiences in this area tend to vary based on the time of day, day of the week, and season. The primary access point for nonmotorized and motorized boats in this area is the Cave Rock boat ramp. Nonmotorized travel routes tend to follow the shore on the lakeward side of most existing buoys. The location standards and number of structures authorized by the proposed Shoreline Plan would not alter these travel routes, because the plan would provide expanded no-wake zones with increased enforcement, would not allow for new buoy fields, would limit pier lengths, and would require space sufficient

to allow navigation around or between buoys. Overall, the nonmotorized recreation experience in this area would not substantially change, because the physical character of the area would not change, nonmotorized travel routes would not change, and the increase in motorized boating activity would be limited (11.5 percent on a peak day) and would occur gradually over the 20-year buildout period of the Shoreline Plan.

South Shore Area (Exhibit 3-7)

The shoreline in the south shore area is characterized by private homes, commercial development, resorts, and public beaches, including Zephyr Cove, Round Hill Pines, Nevada Beach, Pope Beach, and Camp Richardson. Seven marinas are also located in this area (Exhibit 3-7). Recreation opportunities in the South Shore area are abundant and are associated with several large public beaches, nonmotorized watercraft rentals, public piers, public boat launches, and marinas. Motorized and nonmotorized watercraft travel between the beaches in this area and congregate for special events. This area contains some of the most heavily used motorized and nonmotorized travel routes, particularly routes that head west from this area toward Emerald Bay. In the South Shore area, most of the buoys are clustered in buoy fields near the Camp Richardson, Timber Cove, Ski Run, Lakeside, Round Hill Pines, and Zephyr Cove marinas. Compared to other developed shoreline areas around the lake, the South Shore area has a lower concentration of piers, with some located around Zephyr Point and near Round Hill Pines, Lakeside Marina, El Dorado Beach, Regan Beach, and Camp Richardson. The existing physical setting varies with portions of the east side of this area reflecting the rural-developed or suburban WALROS class and areas on the west side more similar to the rural-natural or semi-primitive WALROS class. As shown in Exhibit 3-7, parcels eligible for a new private pier are generally located between the California/Nevada state line and Ski Run Marina. The number of new piers in this area under the proposed Shoreline Plan would be limited by restrictions on the placement of structures in Shorezone Tolerance District 1, which includes much of the area that would otherwise be eligible for new private piers (see Draft EIS Exhibit 2-6). New buoys could be located within the existing buoy fields or adjacent to individual private parcels. Development of these new structures and the redevelopment of existing structures would not alter the character of the existing suburban physical setting, because added new structures would be limited and similar to existing structures and would be located in areas that already contain a substantial amount of shoreline development.

On peak summer days, the shoreline destinations in this area experience high visitation on the beaches and high concentrations of nonmotorized and motorized watercraft in the water. During weekdays and outside of the peak boating season, recreational activity in this area decreases but remains higher than in many areas of the lake. Common travel routes for nonmotorized watercraft in this area are generally either along the shore on the landward side of buoy fields, with heavy use clustered around public beaches, resorts, and marinas. The location standards and number of structures authorized by the proposed Shoreline Plan would not alter these travel routes, because the plan would provide expanded no-wake zones with increased enforcement, would not allow for new buoy fields, would limit pier lengths, and would require space sufficient to allow navigation around or between buoys. Overall, the nonmotorized recreation experience in this area would not substantially change, because the physical character of the area would not change, nonmotorized travel routes would not change, and the increase in motorized boating activity would be limited (11.5 percent on a peak day) and would occur gradually over the 20-year buildout period of the Shoreline Plan.

Emerald Bay Area (Exhibit 3-8)

The Emerald Bay area between Kiva Beach and D. L. Bliss State Park provides a variety of recreation opportunities along a scenic portion of the shoreline characterized by long, sandy beaches; rugged rocky shoreline; Taylor Creek Marsh; and Emerald Bay. Much of this area is publicly owned land with public beaches, including Kiva Beach, Baldwin Beach, and Lester Beach, that allow for launching nonmotorized watercraft. One private community, Cascade Properties, is located along the shoreline between Baldwin Beach and Emerald Bay and includes several buoys (Exhibit 3-8). The physical setting in this area is mostly undeveloped and reflective of the semi-primitive or primitive WALROS class.

This segment includes very popular recreation destinations. Recreation experiences vary substantially. Visitation tends to be high, but opportunities for solitude and adventure exist during off-peak periods. Emerald Bay is a popular destination for tour boats, motorized boats, and nonmotorized watercraft and can

become congested. The shoreline north of Emerald Bay is also a popular destination for motorized and nonmotorized watercraft for viewing the scenic, undeveloped shoreline and cliff jumping. Very few new structures would be developed in this area, and nonmotorized recreation patterns would not be altered. This area could experience increases in visitation from watercraft users, but this change would be partially offset by an expanded no-wake zone encompassing all of Emerald Bay, and any increase in visitation would not change the character of the area, which already receives heavy visitation. Overall, the nonmotorized recreation experience in this area would not substantially change, because the physical character of the area would not change; nonmotorized travel routes would not change; and the increase in motorized boating activity would be limited (11.5 percent on a peak day), would be partially offset by an expanded no-wake zone in Emerald Bay, and would occur gradually over the 20-year buildout period of the Shoreline Plan.

Rubicon Bay Area (Exhibit 3-9)

Public recreation opportunities near Rubicon Bay are very limited because this portion of the shoreline is entirely private property. The area is characterized by residential development interspersed with vegetated areas and sandy beaches. Piers and buoys are highly concentrated along the shoreline in this area and, in particular, at the northern end near Meeks Bay. The existing physical setting is similar to the rural developed WALROS class. Although a large number of parcels in this area are potentially eligible for new private piers (Exhibit 3-9), pier distribution standards in the proposed Shoreline Plan would limit the total number of new piers in El Dorado County to 28. Of these, only six could be placed in visually sensitive shoreline character types, which include approximately the southern half of Rubicon Bay (see Draft EIS Exhibit 2-4). These added new structures would not alter the existing character of this area, because new structures would be limited and similar to existing structures and because this area already contains a substantial amount of shoreline development.

Like other portions of the lake, the recreation experiences in this area vary depending on season, day of the week, and time of day. Nonmotorized boating is primarily associated with private residences and through travelers because there are limited opportunities for public access in this area. Nonmotorized travel tends to be lakeward of existing buoys. The structures authorized under the proposed Shoreline Plan would not alter these recreation patterns, because the plan would provide expanded no-wake zones with increased enforcement, would not allow for new buoy fields, would limit pier lengths, and would require space sufficient to allow navigation around or between buoys. Overall, the nonmotorized recreation experience in this area would not substantially change because the physical character of the area would not change, nonmotorized travel routes would not change, and the increase in motorized boating activity would be limited (11.5 percent on a peak day) and would occur gradually over the 20-year buildout period of the Shoreline Plan.

West Shore Area (Exhibit 3-10)

Public access opportunities along the west shore area are available at Meeks Bay and Sugar Pine Point State Park. Access to the lake is also available at Chambers Landing, Obexer's Marina, and Homewood Marina. Lake access is somewhat limited outside of these areas because much of this portion of shoreline is privately owned. The area between Homewood and Tahoma has a high concentration of piers and buoys, as does the north side of Meeks Bay. The overall physical setting along this segment of shoreline is similar to that described for the rural developed WALROS class, with areas that more closely resemble the suburban class on the northern end of the segment and areas near Sugar Pine Point State Park that resemble a primitive setting. As shown in Exhibit 3-10, many private parcels along the West Shore are potentially eligible for a new private pier, and new buoys could be placed in existing buoy fields and adjacent to individual parcels throughout this segment. However, the proposed Shoreline Plan would designate Sugar Pine Point State Park as a shoreline preservation area, which would prohibit the development of new private structures in the park (see Draft EIS Exhibit 2-12). New structures elsewhere in the west shore area would be located in areas with substantial existing shoreline development. These changes would not change the character of this area, because added new structures would be limited and similar to existing structures and because this area already contains a substantial amount of shoreline development.

The recreation experiences in this area vary both spatially and temporally. Nonmotorized boating tends to be clustered around Meeks Bay, around Sugar Pine Point State Park, and near marinas. Common nonmotorized

travel routes in this area are generally close to the shore in undeveloped areas and on the lakeward side of most existing buoys in developed areas. The location standards and number of structures authorized by the proposed Shoreline Plan would not change these recreation patterns, because the plan would provide expanded no-wake zones with increased enforcement, would not allow for new buoy fields, would limit pier lengths, and would require space sufficient to allow navigation around or between buoys. Overall, the nonmotorized recreation experience in this area would not substantially change because the physical character of the area would not change, nonmotorized travel routes would not change, and the increase in motorized boating activity would be limited (11.5 percent on a peak day) and would occur gradually over the 20-year buildout period of the Shoreline Plan.

3.1.3 Master Response 3 – Motorized Boat Use Estimates

The Shoreline Plan alternatives would authorize new shoreline structures. Some of these structures, including new moorings and boat ramps, would increase access opportunities for motorized boating. As a result, these structures could lead to increases in the amount of motorized boat use on Lake Tahoe, which could affect the environment. To evaluate the extent to which changes in motorized boating would affect the environment under each alternative, it is necessary for the EIS to develop reasonable estimates of the existing and future amount of motorized boating activity on Lake Tahoe. Several comments questioned the assumptions and methodologies that were used to calculate baseline and future motorized boating activity under the Shoreline Plan alternatives. To address these comments, this response provides a detailed description of the process by which boat use estimates were developed, the methodology for collecting data, and the way in which those data were used to derive existing and projected boat activity on Lake Tahoe.

Joint Fact-Finding Process

TRPA convened a Joint Fact-Finding Committee of technical experts to identify the best available information and analytical approaches for this EIS, including estimates of boating activity. Members of the committee included technical specialists from the Tahoe Environmental Research Center; University of Nevada, Reno; California State Lands Commission; Lahontan Regional Water Quality Control Board; Nevada Division of State Lands; TRPA; U.S. Army Corps of Engineers; League to Save Lake Tahoe; Tahoe Area Sierra Club; Tahoe Marina Association; Tahoe Lakefront Property Owners Association; and Ascent Environmental. A primary role of the Joint Fact-Finding Committee was to develop the estimates of motorized boat use incorporated into this EIS. The committee reviewed information on boating activity, including recent boat use monitoring data collected by TRPA; boater registration data; boat inspection program records; boating data collected to support the 2004 Shorezone Ordinance Amendments EIS; boat ramp launch counts; marina maintenance logs and launch records; and surveys of boat operators. Using this information and the specialized knowledge of members of the Joint Fact-Finding Committee, the committee developed the boat use assumptions described in Appendix A of the Draft EIS over the course of multiple meetings, all of which were noticed and open to the public.

Effects of the Shoreline Plan on Motorized Boat Use

The amount of motorized boating activity on Lake Tahoe is directly related to the capacity of access facilities, including moorings and boat ramps. By authorizing new access structures, the Shoreline Plan alternatives would result in an increase in motorized boating activity over time. To determine the amount of motorized boating that could result from the Shoreline Plan alternatives at buildout, the Joint Fact-Finding Committee developed reasonable estimates about the amount of additional motorized boating activity that results from each type of access structure. These estimates are described in Appendix A of the Draft EIS and reflect a good-faith effort and a reasonable and rationale approach to quantify changes in boating activity based on the careful review of the best available information. Because the most relevant boat use metric differs depending upon the environmental resource topic being analyzed, the committee developed estimates for both peak day (i.e., Independence Day or Labor Day weekend) and annual boat use. These estimates are expressed in terms of both boat trips (i.e., the number of unique boat trips) and engine-hours (i.e., the number of hours that boat engines are in operation).

Motorized Boat Use Estimates

Some comments questioned the motorized boat use estimates. Comments requested more information on how the level of boating activity associated with moorings and new boat ramps was estimated, and questioned whether these estimates considered fluctuating lake levels. Some comments suggested that the number of boats inspected through the aquatic invasive species (AIS) inspection program should serve as an estimate of boating activity, and other comments suggested that boating estimates associated with new boat ramps should reflect the maximum number of launches recorded at an existing boat ramp.

Boat Use Associated with Moorings

To develop a reasonably accurate estimate of boating activity that is correlated to the number of moorings on the lake, TRPA performed boat use monitoring in 2014 and 2016. TRPA divided the shoreline into four quadrants. Within each quadrant, the shoreline was divided into 10 grid cells. Two cells in each quadrant were randomly selected, which resulted in a total of eight cells that, together, serve as a representative sample of the shoreline. The TRPA boat crew monitored boat use in these cells over the boating season for 2 years, including during peak holidays (including the Fourth of July and Labor Day weekends), weekends (during the peak season of July 1 through Labor Day), weekdays (during the same peak season), off-peak weekends (during May, June, or between Labor Day and September 30), and off-peak weekdays (during the same off-peak period).

Because not all moorings are in use at any given time, the TRPA boat crew visited each of these cells during the early morning hours and recorded the percent of moorings that were occupied during peak days, peak season weekends and weekdays, and off-peak season weekends and weekdays. Boat use monitoring occurred during periods of low lake levels, which can affect the occupancy rates for slips, boathouses, and boat lifts. To avoid underestimating boating activity that could have been affected by lake levels, the boat use estimates conservatively assumed that all these mooring types were occupied. This conservative approach appropriately accounts for changes in boating activity that could occur due to fluctuating lake levels.

To estimate the percent of the moored watercraft that are in use during a given day, the TRPA boat crew revisited each cell again during midday (when most boating occurs). The number of boats recorded in the early morning in each cell was compared to the number of boats recorded during midday boating hours. Those moorings that were occupied by a boat in the early morning but were not occupied during midday boating hours reflected a boat trip associated with a mooring. This information was used to estimate boating activity associated with moorings, which is described in more detail in Appendix A of the Draft EIS. The boat use associated with moorings was applied to the baseline number of moorings to generate baseline boating activity associated with moorings. The same data were applied to the maximum number of new moorings that could be developed under each alternative to generate estimates of boating activity that would result from moorings under each alternative.

Some comments cite the number of boat inspections and suggest that the number of boats inspected under the AIS program represents the amount of boat use. However, the number of boats inspected each year is not an accurate estimate of boating activity, because inspections don't necessarily correlate to boat trips. Some boats are inspected once, then moored on Lake Tahoe where the number of trips then varies. Other boats are transported to Lake Tahoe from elsewhere and inspected each time they launch. For other analysis, the number of boat inspections may be more indicative of potential impacts. For example, the Draft EIS considers the number of boats inspected in the noise analysis because the number of noise exceedances is, in part, related to the number of unique boats operating on the lake. In other words, the greater the number of unique boats that operate on Lake Tahoe, the greater the chance that boats with exhaust systems that exceed noise limits will occur on the lake.

Boat Use Associated with Boat Ramps

The construction of new boat ramps would also result in additional boating activity. Estimating boat use that would result from new boat ramps is challenging because it is affected by a number of factors that are unknown at this time, including the launch capacity of new boat ramps (which would in turn be affected by the location, design, parking capacity, and accessibility of future boat ramps), the extent to which launching

activities at new boat ramps would constitute new boat use versus boat use that would otherwise occur at other launch sites, and the overall future demand for boat use on Lake Tahoe. The Joint Fact-Finding Committee assumed that new boat ramps would result in new watercraft use at levels comparable to those associated with existing public boat ramps. This is a reasonably conservative approach because it assumes that all boat trips generated at new ramps would be new boat use and not otherwise occur at other launch sites. The actual increase in boat trips from new ramps could be less if, for example, any of the use at the new ramp is existing use transferred from other launch sites.

TRPA assembled records of the annual number of boat launches at public boat ramps on Lake Tahoe from 2010 through 2015. These records are derived from data collected through the AIS boat inspection program and reflect the best available counts of boat launches at public facilities. No data were included from boat ramps that were closed during all or part of the years for which data were available. Thus, the ramp data reflected only typical boat use levels for periods when each ramp was operational. The Joint Fact-Finding Committee reviewed these data and determined that the average number of launches from existing public boat ramps would provide a reasonably conservative estimate of boat trips associated with new boat ramps.

Some comments suggest that the estimate of boat use associated with boat ramps should reflect the highest recorded number of launches during the 6 years for which data are available. This extremely conservative estimate of boat launches was considered but not adopted. The Joint Fact-Finding Committee's recommended approach was included in the EIS because it reflects a reasonably conservative assumption that the committee determined was the most accurate estimate of boat use associated with ramps. The Committee's reasoning was that boating activity fluctuates year to year over a period of years due to factors such as fuel prices, broader economic conditions, weather, and lake levels. To assume maximum use every year for all boat ramps vastly overstates boat use and is an unnecessarily conservative approach to estimate boat use. As described above, the boat ramp launch estimate in this EIS may already overestimate the number of launches attributable to new ramps because it assumes that all launches at a new ramp would be new boat trips. That is, it assumes that none of the launches that occur at a new boat ramp would have occurred anyway at a different boat ramp if the new ramp were not constructed. Furthermore, although overestimating boat use attributable to public boat ramps could be considered a conservative approach to evaluating effects on some resource areas, it would misrepresent effects if used in other resource analysis, such as determining the fair share distribution of recreation capacity (Draft EIS pages 8-31 through 8-34), which compares boat use associated with public and private facilities. Having adopted a conservative approach to the boat use analysis, it is not necessary to adopt a different conservative approach simply because it is preferred by a commenter. This EIS appropriately incorporates reasonably conservative estimates of boat use that allow for an accurate assessment of environmental impacts across multiple resource areas.

Other Baseline Boat Use Estimates

The estimates of baseline boat use also incorporate other sources of boat use. Boat use from existing motorized boat rental concessions were incorporated into the baseline boat use estimates based on data from rental concession inventories completed by TRPA in 2014 and 2017. Boating activity is also associated with boats that are stored on racks at marinas and launched using mobile gantry lifts. The Shoreline Plan would not change regulations affecting marina racks and gantry lifts and would, therefore, not change the boat use associated with these access facilities. Estimates of baseline boating activity resulting from rack and gantry lift facilities are based on an inventory of these existing facilities. These facilities account for a very small proportion of boating activity on the lake.

Engine Run Time

Some resource areas, such as air quality, greenhouse gases, and water quality, are affected by the operation of boat engines rather than the total number of boat trips. To support the analysis of these resource areas, the Joint Fact-Finding Committee developed reasonable estimates of boat engine-hours associated with each boat trip.

To estimate the engine-hours associated with each trip, the committee considered the best available information, including maintenance records available from Lake Tahoe marinas. The maintenance records include detailed data on the total number of trips for each watercraft, and the total hours of operation for the season, which is recorded by an hour meter on each boat engine. By dividing the total engine-hours for the season by the number of trips that season, the committee was able to generate a reasonably accurate estimate of the average engine-hours per trip.

To test this estimate, TRPA performed additional engine-hour monitoring in summer 2017. TRPA staff recorded the hour meter readings and registration numbers on 200 separate vessels launched at various points around the lake. Staff remained at the launch points and recorded the engine-hours from the same vessels when they were removed from the lake that day. This provided an actual measurement of engine-hours per trip from boats in use on Lake Tahoe. The engine-hour monitoring verified the engine-use data derived from marina maintenance records, which provided a high level of confidence in the estimates of engine-hours.

Some comments suggest that the EIS should incorporate the estimates of engine-hours used in the 2004 Shorezone Ordinance Amendments EIS (TRPA 2004). However, the estimates in the 2004 EIS were less accurate because they relied on a qualitative survey of boat users, which asked boat users to estimate the length of their boat trip rather than relying on measured data. The 2004 EIS estimates provide a reasonable estimate of total trip length. However, boat operators typically do not operate their engines for the entire duration of a boat trip. The actual measurements of engine-hours incorporated into this EIS from the marina maintenance records and 2017 engine-hour monitoring provide a more accurate estimate of typical engine-hours per trip.

Mooring Types

Because different amounts of boat use are associated with different types of moorings, it is necessary to develop reasonable estimates about the proportion of new moorings that would be buoys, slips, and boat lifts. To develop a reasonable estimate of the number of boat lifts that might be added under the Shoreline Plan, the proportion of existing piers that include boat lifts was calculated. The Draft EIS assumes that the same proportion of new piers would include a boat lift.

Under the proposed Shoreline Plan, new slips would be restricted to marinas and public facilities. To estimate the number of new slips that would be permitted under the proposed Shoreline Plan, TRPA surveyed existing marina owners about possible future expansions or conversions of buoys to slips. Two marinas indicated a desire to add slips, which would result in up to 65 new slips. No other marina owners expressed an interest in additional slips. The number of new moorings, by type, that were included in the analysis in the Draft EIS is presented in Table 3-3.

Table 3-3 Estimated Number of New Moorings Associated with Each Alternative

Mooring Type	Alternative 1 – Proposed Shoreline Plan	Alternative 2 – Maintain Existing TRPA Shorezone Regulations	Alternative 2 with Mitigation	Alternative 3 – Limit New Development	Alternative 4 – Expand Public Access and Reduce Existing Development
Buoys	2,006	4,871	2,006	300	0
Slips	65	1,897	65	65	0
Boat lifts	45	168	45	30	0
Boat houses	0	0	0	0	0
All moorings	2,116	6,936	2,116	395	0

Although the exact composition of mooring types that would be permitted under the Shoreline Plan cannot be known with certainty, the Draft EIS presents a reasonable estimate of the mix of moorings at buildout based on a rationale good-faith consideration of the available data.

Some comments suggest that a higher proportion of new moorings would be boat lifts; but there is no reason to believe that the proportion of piers with a boat lift would increase under the Shoreline Plan. Boat lifts are more expensive than buoys and are often unusable during periods of low lake levels, whereas buoys are more affordable and more easily moved into deeper water, where they would remain functional during periods of low lake levels. These factors would argue against assuming an increase in the proportion of boat lifts. Therefore, it would be unreasonable to assume that the Shoreline Plan would result in an increase in the proportion of piers with boat lifts. Notably, the difference in boat use associated with each mooring type is very minor. As shown on page 4 in Draft EIS Appendix A, 31.18 engine-hours are associated with a buoy per year, whereas 32.44 engine-hours are associated with a boat lift. If the actual proportion of lifts was greater than assumed in the EIS, it would not materially change the conclusions in the Draft EIS.

As described above, the Draft EIS incorporates reasonably conservative estimates of boating activity. These estimates are based on a rationale, good-faith effort to collect and interpret the best available information on boating activity on Lake Tahoe.

3.1.4 Master Response 4 – Watercraft Emissions

The Shoreline Plan alternatives would authorize new shoreline structures, some of which, including new moorings and boat ramps, would increase access opportunities for motorized boating, which in turn could generate air pollutant emissions. To evaluate the extent to which emissions from motorized boating would affect air quality and indirectly affect water quality, the EIS includes reasonable estimates of future air pollutant emissions that could occur under the Shoreline Plan alternatives. Through the Joint Fact-Finding process, described on page 1-2 of the Draft EIS, TRPA convened a group of technical experts to identify the best available information to develop these emission estimates. TRPA considered all available information on watercraft emissions and determined that the California Air Resources Board (CARB) inventory of watercraft emissions provides the best available information to estimate watercraft emissions associated with the Shoreline Plan alternatives, for the reasons described below.

Based on this information, the Draft EIS found that emissions from motorized boating associated with new moorings and ramps would be offset by fleet turnover, resulting in less-than-significant impacts on air quality and water quality under the proposed Shoreline Plan. In other words, because new boats sold or registered in California and elsewhere are required to meet current CARB or EPA standards, respectively, as older, higher-polluting boats reach the end of their serviceable lifespan, they are replaced by newer boats that comply with current more stringent emission standards. The reduction in emissions from the replacement of older boats more than offsets the emissions from the additional boating activity that could occur under the proposed Shoreline Plan.

Several comments address different aspects of the analysis of air pollutant emissions from motorized watercraft. In particular, comments posed questions about the finding that the fleet of recreational watercraft operating on Lake Tahoe would become cleaner over time as a result of compliance with watercraft engine emission standards adopted by the U.S. Environmental Protection Agency (EPA) and CARB. Some comments agreed that watercraft emissions would decrease by buildout of the Shoreline plan in 2040 but expressed concern that emissions could increase during the interim period. Other comments questioned the emission calculation methodology and suggested that the analysis did not account for all the boating activity on Lake Tahoe.

To comprehensively respond to these comments, this master response presents a detailed explanation of the analytical approach and the rationale for the conclusion that air pollutant emissions would be less than significant. It addresses the following topics:

- ▲ watercraft emission standards,
- ▲ emissions of all watercraft operating in the Lake Tahoe Air Basin (LTAB),
- ▲ watercraft emission inventory projections by CARB,

- ▲ fleet turnover,
- ▲ emission estimates calculated in the 2004 Lake Tahoe shorezone ordinance amendments Draft EIS,
- ▲ emission estimates for interim years, and
- ▲ emission estimates for interim years with twice the projected increase in watercraft activity.

WATERCRAFT EMISSION STANDARDS

The assumptions and analysis of emission standards in the Draft EIS is reasonable, rationale, and based on the best available information. Existing emission standards for recreational watercraft are described in the Draft EIS on pages 10-4 and 10-5, and in the revised version of Table 10-3, below. Some comments suggest that the analysis is flawed and relies on assumptions that emission standards will become more stringent in the future. This is not the case. Although emission standards may or may not be amended in the years to come, the analysis in the Draft EIS reflects only those standards that are currently in effect (13 CCR 2442, 40 CFR 91.104, and 40 CFR 1045.103). The anticipated future benefit is from retirement of older boats that do not currently meet emission standards, replaced by newer boats that are required to meet current standards, as described below.

Revised Table 10-3 Emission Rates Pursuant to EPA and CARB Exhaust Emission Standards for Spark-Ignition Personal Watercraft and Outdoor Marine Engines of 50, 100, and 200 Horsepower

Model Year	HC + NO _x (lb/hr) ¹					
	50-hp Engine		100-hp Engine		200-hp Engine	
	EPA	CARB	EPA	CARB	EPA	CARB
1998	0.14	— ²	0.13	— ²	0.13	— ²
1999	0.13	— ²	0.12	— ²	0.12	— ²
2000	0.12	— ²	0.11	— ²	0.11	— ²
2001	0.10	0.04	0.10	0.04	0.10	0.04
2002	0.09	0.04	0.09	0.04	0.08	0.04
2003	0.08	0.04	0.08	0.04	0.07	0.04
2004	0.07	0.03	0.06	0.03	0.06	0.03
2005	0.06	0.03	0.05	0.03	0.05	0.03
2006	0.04	0.03	0.04	0.03	0.04	0.03
2007	0.04	0.03	0.04	0.03	0.04	0.03
2008	0.04	0.02	0.04	0.01	0.04	0.02
2009	0.04	0.02	0.04	0.01	0.04	0.02
2010 and newer	0.02	0.02	0.01	0.01	0.01	0.02
Factor of increased level of stringency from 1998 model year to 2010 model year	9.1	9.1	9.1	9.1	9.0	9.0

Notes: HC = total hydrocarbons; NO_x = oxides of nitrogen; lb/hr = pounds per hour; hp = horsepower; EPA = U.S. Environmental Protection Agency; CARB = California Air Resources Board.

¹ The values presented in this table for 50-, 100-, and 200-hp engines were calculated using the mathematical expressions in which the emission standards are expressed, including EPA's emission standards presented in Table 10-2 and CARB's emission standards presented in Table 10-4.

² Model years 1998-2000 registered in California were subject only to EPA emission standards because CARB did not establish more stringent emission standards for those model years.

Source: Calculated by Ascent Environmental using the equations for federal emission standards listed in Tables 10-2 and 10-3 and a load factor of 40 percent. See Appendix C for detailed calculations.

Table 10-3 in the Draft EIS shows how the emission standards established by EPA and CARB result in cleaner watercraft engines over time. Draft EIS Table 10-2 and Table 10-4 present the emission standards promulgated by EPA and CARB, respectively, as mathematical expressions. To better understand the degree to which the emission standards in Table 10-2 and Table 10-4 become more stringent for later model year

engines, revised Table 10-3, below, shows emissions of total hydrocarbons and oxides of nitrogen (NO_x) for engines that are compliant with EPA and CARB standards. It depicts how EPA and CARB standards apply to engines with power ratings of 50 horsepower (hp), 100 hp, and 200 hp (equivalent to 37 kilowatts [kW], 75 kW, and 149 kW, respectively) and operating at 40 percent load. The values contained in revised Table 10-3 of the Draft EIS correctly convert grams to pounds and include data for both EPA and CARB standards.

The fact that emission standards for watercraft promulgated by EPA lag behind those of CARB is evident in revised Table 10-3. For instance, a 50-hp watercraft of model year 2001 is subject to CARB's emission standard of 0.04 pound per hour and the same emission standard was not required by EPA until model year 2006. This is also the case for 100-hp and 200-hp engines. The table represents emission standards already in effect. Thus, contrary to what the comments suggest, the Draft EIS is not assuming that EPA (or CARB) will establish more stringent emission standards for future model years.

As shown in Table 10-2, revised Table 10-3, and Table 10-4, emission standards for recreational watercraft are more stringent for later model years; thus, the watercraft fleet is expected to generate fewer emissions as older vessels age out and are replaced by newer ones. It is important to note that the emission rates presented in revised Table 10-3 are included to allow the reader to understand the emission standards. The conversion of grams to pounds in Draft EIS Table 10-3 was not used in any of the calculations that support the analysis of Impact 10-1, which are presented in Appendix C of the Draft EIS.

EMISSIONS OF ALL WATERCRAFT OPERATING IN THE LAKE TAHOE AIR BASIN

The air quality emissions analysis in the Draft EIS is reasonable, rational, and based on the best available information. Several comments questioned the assumptions used in the air quality emission calculations. Comments inquire as to why emissions of all recreational watercraft operating in the LTAB—including watercraft registered outside of California and therefore not subject to the emission requirements established by CARB—are not quantified. They suggest that the actual emissions from all watercraft in the LTAB would be greater than those presented in the Draft EIS, which are based on the CARB inventory of watercraft emissions and other data.

The actual inventory of watercraft emissions in the LTAB cannot be feasibly or reliably calculated because of serious defects in the data, described below. Therefore, the EIS analysis does not attempt to quantify watercraft emissions in the LTAB. Instead, the analysis presented in table 10-5 of the Draft EIS uses the best available information, which pertains to the expected trend in watercraft emissions in the LTAB. The trend in watercraft emissions provides the most accurate and meaningful metric to evaluate the changes in emissions for all watercraft operating within the LTAB. Comments provide no basis or evidence to support claims that aggregating individual boat emissions from the LTAB, even if it were feasible, would lead to a different conclusion for Impact 10-1 of the Draft EIS.

Comments refer to a memorandum to the Joint Fact-Finding Committee dated November 3, 2017, as the preferred basis for emissions analysis. The memo shows the distribution of watercraft operating on Lake Tahoe based on engine type, engine size, and model year (Ascent Environmental 2017:2), and the comments suggest that these data could be aggregated in the LTAB. However, as stated in the memorandum, the data set is insufficient. Because only 54 percent of the records in the data set are complete, TRPA concluded that relying on this data to aggregate emissions from all watercraft in the LTAB would be unreliable, inaccurate, and would produce erroneous output, as described in detail below. Beyond this data set, no other data or information is available on which to form the alternative analysis advocated by the commenter.

The suggested approach of aggregating emissions from each watercraft in the LTAB is infeasible for many reasons. First, EPA and CARB have not developed either the needed data or a model for estimating watercraft emissions similar to the EMFAC model developed for estimating on-road motor vehicle emissions (CARB 2018). To estimate watercraft emissions would require information that is simply not available for the existing fleet of recreational watercraft operating on Lake Tahoe. Second, although a set of boat registration data is available from 2015, it is unreliable and unusable. Of the 12,663 records in the data set, 5,982 of

them do not contain complete information regarding the vessel's horsepower rating and model year, which are key inputs to computing emission rates. Also, for those records for which model year data are available, it is unclear whether the reported model year pertains to the boat's engine or to the body of the boat. For instance, many records include the make and model of the boat rather than the size of the engine, which is important because, unlike cars, engine sizes and associated emissions can vary for the same make and model of watercraft. In addition, the data set contains multiple groupings of records with duplicate registration numbers and different values for the model year and engine type and size, which make the data unreliable. Furthermore, the data set does not include values for the engine load factor—a value that indicates the portion of used engine power and that factor would be needed for each engine type and size. Typically, watercraft engines operate at varying intensities depending on the travel speed of the boats. The suggested approach of aggregating emissions from each watercraft would require developing assumptions regarding the typical load factor profile for each recreational watercraft, and no reliable foundation data are available to support such assumptions. Although CARB has published load factors for different engine types, it has not done so for different engine sizes and model years. Moreover, emission factors are not available for watercraft engines older than 2001 (Ascent Environmental 2017:5). All of these data and analytical deficiencies taken together make the commenter's suggested analysis infeasible.

Some comments assert that the Draft EIS relies only on the CARB inventory, and erroneously conclude that the analysis excludes any emissions from in-Basin boats registered in Nevada and boats registered in other regions of California but used in the Tahoe Basin. While the analysis uses CARB's inventory, which does account for all California-registered boats in use in the LTAB, that inventory is not the *only* information on which the analysis relies. The analysis relies primarily on the expected downward trend in watercraft emissions in the LTAB and the fact that the watercraft fleet will become cleaner as it turns over because of both federal and CARB emission standards. This trend is expected for watercraft generally, including watercraft registered in California *and* in Nevada as well as other states. This is explained in Section 10.4.1, "Methods and Assumptions," starting on page 10-14 of the Draft EIS, in the discussion of Impact 10-1, and expounded upon below.

CARB's emission inventory indicates a net reduction in emissions over time from recreational watercraft registered in the LTAB despite expected growth in the number of watercraft. This net reduction is attributable to the emission standards established by CARB that are more stringent for later model year engines. The same is also expected of watercraft registered in Nevada and elsewhere because they are subject to EPA's emission standards, which also are more stringent for later model year engines. In fact, the overall net reduction in emissions for boats outside of California is expected to be greater because the future emission reductions attributable to fleet turnover will be greater for boats manufactured prior to 2010 that comply with only EPA standards. As shown in revised Table 10-3, prior to 2010, CARB standards were more stringent than EPA standards. Therefore, boats manufactured prior to 2010 that only complied with EPA standards would emit more pollution than boats manufactured prior to 2010 that complied with more stringent CARB standards. All boats manufactured in 2010 or later would have the same, reduced emissions, regardless of whether they comply with EPA or CARB standards. As a result, when older boats that only comply with EPA standards are replaced with newer boats, the reduction in emissions is greater than for older boats that comply with CARB standards.

Some comments request explanation as to how the emission projections in Table 10-7 were developed. Notes 1–4 in Table 10-7 indicate how the values in the table were calculated and point the reader to Appendix C of the Draft EIS for data and calculations compiled to build the table. As stated above, net emissions from watercraft not registered in California cannot be quantified with any reasonable degree of accuracy; therefore, the net change in emissions of reactive organic gases (ROG), NO_x, respirable particulate matter (particulate matter with an aerodynamic diameter of 10 micrometers or less) (PM₁₀), and fine particulate matter (particulate matter with an aerodynamic diameter of 2.5 micrometers or less) (PM_{2.5}) shown in Table 10-7 is conservative. If emissions from non-California watercraft were included in this calculation, then the total net reduction in emissions of these pollutants would be even larger than shown in the table because a larger fleet of watercraft that experiences turnover with time will achieve a larger net reduction in emissions than a smaller fleet of watercraft. The fleet of non-California watercraft is also expected to get cleaner as it turns over, as new

boats will be required to meet EPA emission standards. For more insight about the expected turnover of non-California watercraft, refer to the discussion under “Fleet Turnover,” below.

Comments also suggest that the projected increase in watercraft activity used in the emission estimates for Impact 10-1 is inconsistent with boating level increases used to evaluate other resource topics. In response, note that the emission estimates presented for Impact 10-1 are based on CARB’s projected emission inventory for LTAB and the expected percentage increase in boating activity. This combined approach is used because unlike other impacts that can reliably use boating level increases to assess environmental change, emissions cannot be reliably estimated solely from boating use estimates. Instead, the analysis uses the best available information to assess the impact, which is CARB’s projected emission inventory, CARB and EPA emission standards for watercraft, and the expected *percent change* in watercraft activity associated with the increase in shoreline facilities. See also Master Response 3 – Motorized Boat Use Estimates, which describes estimates of watercraft activity and explains which watercraft use metrics are applicable to each area of analysis.

WATERCRAFT EMISSION INVENTORY PROJECTIONS BY THE CALIFORNIA AIR RESOURCES BOARD

Some comments ask about the data used by CARB to estimate the projected level of emissions generated by recreational watercraft. Comments request details on the age of watercraft engines, timing of CARB’s update of emissions estimates, and other information. As explained in the notes of Tables 10-5, 10-7, 10-8, 10-9, and 10-10 of the Draft EIS, watercraft emissions for boats registered in California and operating in the LTAB are from CARB’s California Emissions Projection Analysis Model (CARB 2017a). This model considers the range of watercraft types, engine sizes, and ages for all California-registered watercraft operating in the LTAB, including those watercraft that are registered elsewhere in California but operate in the LTAB. The CARB inventory includes a breakdown by watercraft type and CARB staff indicate that the model reflects the agency’s best available information on watercraft emissions (Chou, pers. comm., 2018). In fact, the emissions estimates in the CARB model may be conservative because a review of engine certifications of major watercraft manufactures indicates that manufacturers are producing engines with emission levels that are substantially lower than required by CARB and EPA standards (see Appendix C of this Final EIS). Thus, the actual decrease in emissions due to fleet turnover may be greater than estimated in the Draft EIS.

CARB’s breakdown of NO_x projections in the LTAB by watercraft type for 2017 and 2035 is provided in its emission inventory document, *Emission Projection by Emission Inventory Code* (CARB 2017b). This document is provided in Appendix C of this Final EIS. Based on thorough research and evaluation of available data, TRPA has determined that CARB’s emission inventory is the most reliable source of watercraft emission projections in the LTAB. Comments provide no other data or projections.

FLEET TURNOVER

Comments request additional detail on fleet turnover assumptions as they relate to existing information about boats on Lake Tahoe. The analysis reasonably assumes that fleet turnover will occur, but does not rely on a specific turnover rate and nor is such a rate explicitly stated or calculated. Instead, it is embedded in the emission inventory provided by CARB’s California Emissions Projection Analysis Model (CARB 2017a). This source is cited in Tables 10-5, 10-7, 10-8, 10-9, and 10-10 of the Draft EIS. For boats registered in California, this assumption is supported by the emission inventory published by CARB and summarized in Table 10-7 of the Draft EIS. Staff at CARB have confirmed that the reason emissions of criteria air pollutants and precursors generated by boats in the LTAB are projected to decrease from 2017 to 2035 is that CARB’s emission standards for boats will result in a cleaner boat fleet, and the improvement in emissions will more than offset the increase in boating activity (Chou, pers. comm., 2018). For boats registered outside of California that operate on Lake Tahoe, the fleet turnover benefits will be even larger than from California-registered boats. The analysis assumes that the fleet of boats not registered in California and not subject to CARB’s emission standards will also turn over as older boats are retired and replaced by newer boats. This assumption is reasonable because watercraft have a finite useable lifespan, and there is no reason to believe the turnover rate of the non-California fleet would be substantially different from that of watercraft

registered in California. The idea that fleet turnover will lead to a cleaner fleet is supported by the emission standards promulgated by both CARB and EPA, which become more stringent for later model year engines, as shown in revised Table 10-3, above, and Tables 10-2, 10-3, and 10-4 of the Draft EIS.

None of the comments provide evidence or rationale as to why TRPA should not rely on CARB's emission projections to estimate the rate of fleet turnover for California-registered watercraft in the LTAB, nor do any provide evidence that the fleet of watercraft registered outside California in the LTAB will turn over at a different rate than watercraft registered in California.

EMISSION ESTIMATES IN THE 2004 LAKE TAHOE SHOREZONE ORDINANCE AMENDMENTS EIS

One comment inquires as to why the emission analysis in the Draft EIS came to a different conclusion than the emission analysis in the July 2004 Lake Tahoe Shorezone Ordinance Amendments Draft EIS. The comment implies that the 2004 EIS aggregated emissions from all watercraft operating in the LTAB.

For the many reasons stated in this master response, TRPA determined that the emission analysis used in the Draft EIS for Impact 10-1 is based on the most relevant information available, including the emission projections published by CARB for watercraft activity in the LTAB (as shown in Table 10-5), which account for increasingly stringent watercraft emission standards by both CARB and EPA (as shown in Tables 10-2, 10-3, and 10-4).

The emission analysis in the 2004 Draft EIS relied on the older, now out of date, emission inventory published by CARB at the time (TRPA 2004:8-7 and 8-8). As with this EIS, the 2004 Draft EIS analysis did not aggregate emissions from all watercraft operating in the LTAB. As explained on pages 8-17 and 8-18 of the 2004 Draft EIS, "[Emission] estimates were generated by dividing the base year emissions by the estimated number of boat trips for the base year to generate an emission factor for each pollutant per boat trip. These factors were then multiplied by the number of additional boat trips in the other analyses to estimate total emissions per year. The increase [in emissions] over base year was determined by subtracting the base year emissions from the emissions for each alternative" (TRPA 2004).

The approach used in the 2004 Draft EIS is less accurate than the approach used in this EIS because it did not take into account that older watercraft with higher emission rates will be replaced by newer, cleaner watercraft—an expectation that is supported by the emission standards established by EPA and CARB, as well as CARB's projections of future watercraft emission levels.

EMISSION ESTIMATES FOR INTERIM YEARS

A number of comments point out that the emission analysis in the Draft EIS focuses on the resultant emission level in 2040, the buildout year of the Shoreline Plan. These comments request additional analysis to address whether implementation of the Shoreline Plan could result in an increase in emissions of criteria air pollutants and precursors during an interim year, and whether nearer-term increases in boating activity would be offset by the improvements in emission efficiency of the watercraft fleet.

Additional analysis to address this question is provided here for interim years 2024, 2029, and 2034, which would be the fifth, tenth, and fifteen year, respectively, from 2019, which is the earliest year in which the Shoreline Plan would be implemented.

As shown in Table 2-3 of the Draft EIS, the estimated existing level of recreational watercraft activity on a peak summer day is 12,512 engine-hours per day, which refers to the amount of engine operation per day. Based on the proposed Shoreline Plan's expected authorization of no more than 15 percent of the available permits each year, the watercraft activity on a peak summer day could increase to 13,374 engine-hours per day in 2024 (an increase of up to 6.9 percent over existing levels), 13,635 engine-hours per day in 2029 (an increase of up to 9.0 percent over the existing level), 13,990 engine-hours per day in 2034 (an increase of up to 11.8 percent over the existing level), and 14,094 engine-hours per day in the planning horizon year

(2040) (an increase of up to 12.6 percent over the existing level). Table 3-4 summarizes the net change in emissions in the LTAB under the proposed Shoreline Plan for these interim years. (Table 3-4 is essentially an expansion of Table 10-7 on page 10-17 of the Draft EIS.)

Table 3-4 Net Change in Operational Emissions in the Lake Tahoe Air Basin, by Interim Year of Plan Buildout under the Proposed Shoreline Plan (Alternative 1)

Emission Source and Year	Peak-Day Emissions (lb/day)				
	NO _x	ROG	CO	PM ₁₀	PM _{2.5}
Existing Boating Activity (2017) ¹	322	1,376	5,536	90	68
2024					
Boating Activity	299	992	5,413	66	51
Increase in On-Road Vehicle Travel ²	4	4	40	<1	<1
Net Change ³	-19	-380	-83	-23	-17
2029					
Boating Activity	281	758	5,311	52	39
Increase in On-Road Vehicle Travel ²	2	3	28	<1	<1
Net Change ³	-39	-615	-197	-37	-29
2034					
Boating Activity	273	624	5,488	42	31
Increase in On-Road Vehicle Travel ²	2	2	21	<1	<1
Net Change ³	-48	-750	-87	-47	-37
2040⁴					
Boating Activity	270	610	5,485	43	32
Increase in On-Road Vehicle Travel ²	1	1	10	1	1
Net Change ³	-51	-765	-38	-46	-36

Notes: lb/day = pounds per day; NO_x = oxides of nitrogen; ROG = reactive organic gases; CO = carbon monoxide; PM₁₀ = respirable particulate matter (particulate matter with an aerodynamic diameter of 10 micrometers or less); PM_{2.5} = fine particulate matter (particulate matter with an aerodynamic diameter of 2.5 micrometers or less).

¹ Emissions generated by existing levels of boating activity in the Lake Tahoe Air Basin are provided by CARB's emission inventory (CARB 2017a). These values are based on emission factors for boats registered in California.

² Emissions associated with the increase in roadway vehicle travel were estimated using the projected level of vehicle miles traveled, as shown in Table 10-6, and emission factors from EMFAC2014v1.0.7 (CARB 2017c). The emission estimates for the increase in on-road vehicle activity for years 2024, 2029, 2034, and buildout (2040) conservatively assume that all the new vehicle trips associated with all the new moorings and boat ramps would occur even though the increase in vehicle trips and associated emissions would be proportional to the increase in new watercraft facilities.

³ The net change in emission levels accounts for the change in emissions per boat only for boats registered in California. However, the relative net change in emissions generated by Nevada-registered boats is assumed to be comparable.

⁴ The estimates of emission levels generated by boating activity in 2040 are based on CARB's projected inventory for 2017, 2024, 2029, 2034, and 2035. Emission estimates for 2035 were used to evaluate full buildout under the Plan in 2040 because 2035 is the latest calendar year for which CARB projects future emission levels. These estimates account for the expected growth in boating activity by boats registered in California as well as increases resulting from this alternative (as shown in Table 10-6 in the Draft EIS). Source: Data and calculations compiled by Ascent Environmental in 2018. See Appendix C in the Draft EIS for detailed modeling results and calculations.

As shown in Table 3-4, the projected increase in watercraft activity and associated on-road vehicle activity would result in no net increase in NO_x, ROG, carbon monoxide (CO), PM₁₀, or PM_{2.5} during interim years before 2040. Similarly, as explained on page 10-17 of the Draft EIS, no net increase would occur over the planning horizon of the Shoreline Plan because emission rates for recreational watercraft on Lake Tahoe would decrease substantially. Any increase in boating activity and associated roadway vehicle travel resulting from the plan would be more than offset by fleet turnover consistent with the California and federal emission standards for recreational watercraft. Because of the long-term reduction in emissions of ozone precursors, CO, PM₁₀, and PM_{2.5} that would result from stricter standards and cleaner engines over time, implementation of the proposed Shoreline Plan would not result in the deterioration of ambient air quality nor exceed an applicable air quality standard during interim years. It would also not contribute to

nonattainment designation with respect to the California ambient air quality standards and numeric TRPA threshold standards for ozone and PM₁₀ or inhibit implementation of the CO Maintenance Plan during interim years. Consistent with the findings in the Draft EIS, this impact would be less than significant under full buildout of the proposed Shoreline Plan in 2040, as well as in the interim years analyzed.

Moreover, the results presented in Table 3-4, as well as in Table 10-7 of the Draft EIS, are conservative because they do not reflect the anticipated larger net reduction in emissions from watercraft not registered in California (and not already subject to more stringent emission standards). It is expected that the turnover of the portion of the watercraft fleet not registered in California will result in a greater net reduction in emissions than the reduction realized by turnover of watercraft registered in California because the portion of the existing watercraft fleet not registered in California is likely more emission intensive than the portion of the existing watercraft fleet subject to CARB's standards.

EMISSION ESTIMATES FOR INTERIM YEARS WITH TWICE THE PROJECTED INCREASE IN WATERCRAFT ACTIVITY

Comments express concern that the estimated increases in watercraft activity on a peak day, expressed in boat-hours per day and presented in Tables 2-3 and 10-6 of the Draft EIS, may underestimate the true increase in watercraft activity that could result from implementation of the Shoreline Plan. These comments question whether air quality impacts would be significant if the increase in watercraft activity would be higher than predicted.

As described in Master Response 3 – Motorized Boat Use Estimates, the estimates of watercraft activity in the Draft EIS are based on rigorous boat use monitoring and a reasoned, rational, and good-faith consideration of the best available information. The level of watercraft activity analyzed in the Draft EIS is considered a reasonably conservative estimate that accurately reflects the expected changes under the alternatives. Nonetheless, in response to the comments, additional analysis is provided here to evaluate the emissions that would occur with an even more highly conservative assumption – twice the predicted increase in watercraft activity.

Table 3-5 displays operational emission levels for the hypothetical scenario that assumes twice the increase in peak-day watercraft activity for each of the interim years analyzed for the proposed Shoreline Plan. As shown, the peak-day level of watercraft activity would increase from its existing level by 13.8 percent to 14,235 engine-hours per day by 2024, 17.9 percent to 14,757 engine-hours per day by 2029, 23.6 percent to 15,468 engine-hours per day by 2034, and 25.3 percent to 15,676 engine-hours per day by buildout (2040).

Table 3-5 Net Change in Operational Emissions in the Lake Tahoe Air Basin, by Interim Year of Plan Buildout under the Proposed Shoreline Plan (Alternative 1), with Twice the Increase in Watercraft Activity

Emission Source and Year	Peak-Day Emissions (lb/day)				
	NO _x	ROG	CO	PM ₁₀	PM _{2.5}
Existing Boating Activity (2017) ¹	322	1,376	5,536	90	68
2024					
Boating Activity	319	1,056	5,761	71	55
Increase in On-Road Vehicle Travel ²	4	4	40	<1	<1
Net Change ³	0	-317	265	-19	-13
2029					
Boating Activity	304	821	5,749	57	42
Increase in On-Road Vehicle Travel ²	2	3	28	<1	<1
Net Change ³	-15	-552	240	-33	-25

Table 3-5 Net Change in Operational Emissions in the Lake Tahoe Air Basin, by Interim Year of Plan Buildout under the Proposed Shoreline Plan (Alternative 1), with Twice the Increase in Watercraft Activity

Emission Source and Year	Peak-Day Emissions (lb/day)				
	NO _x	ROG	CO	PM ₁₀	PM _{2.5}
2034					
Boating Activity	302	690	6,001	47	35
Increase in On-Road Vehicle Travel ²	2	2	21	<1	<1
Net Change ³	-19	-684	486	-43	-33
2040⁴					
Boating Activity	301	679	6,104	48	35
Increase in On-Road Vehicle Travel ²	1	1	10	1	1
Net Change ³	-20	-696	578	-41	-32

Notes: lb/day = pounds per day; NO_x = oxides of nitrogen; ROG = reactive organic gases; CO = carbon monoxide; PM₁₀ = respirable particulate matter (particulate matter with an aerodynamic diameter of 10 micrometers or less); PM_{2.5} = fine particulate matter (particulate matter with an aerodynamic diameter of 2.5 micrometers or less).

Total values may not add correctly because of rounding. See Appendix C in the Draft EIS for detailed modeling results and calculations.

¹ Emissions generated by existing levels of boating activity in the Lake Tahoe Air Basin are provided by CARB's emission inventory (CARB 2017a). These values are based on emission factors for boats registered in California.

² Emissions associated with the increase in roadway vehicle travel were estimated using the projected level of vehicle miles travelled, as shown in Table 10-6, and emission factors from EMFAC2014v1.0.7 (CARB 2017c). The emission estimates for the increase in on-road vehicle activity for years 2024, 2029, 2034, and buildout (2040) conservatively assume that all the new vehicle trips associated with all the new moorings and boat ramps would occur even though the increase in vehicle trips and associated emissions would be proportional to the increase in new watercraft facilities.

³ The net change in emission levels accounts for the change in emissions per boat only for boats registered in California. However, the relative net change in emissions generated by Nevada-registered boats is assumed to be comparable.

⁴ The estimates of emission levels generated by boating activity in 2040 are based on CARB's projected inventory for 2017, 2024, 2029, 2034, and 2035. Emission estimates for 2035 were used to evaluate full buildout under the Plan in 2040 because 2035 is the latest calendar year for which CARB projects future emission levels. These estimates account for the expected growth in boating activity by boats registered in California as well as increases resulting from this alternative (as shown in Table 10-6 in the Draft EIS).

Source: Data and calculations compiled by Ascent Environmental in 2018.

As shown in Table 3-5, twice the projected increase in watercraft activity and associated on-road vehicle activity shows no net increase in NO_x, ROG, PM₁₀, or PM_{2.5}. Twice the increase in boating activity and associated roadway vehicle travel resulting from the proposed Shoreline Plan would be more than offset by fleet turnover consistent with California and federal emission standards for recreational watercraft for NO_x, ROG, PM₁₀, or PM_{2.5}. Because of the long-term reduction in emissions of NO_x, ROG, PM₁₀, or PM_{2.5} that would result from stricter standards and cleaner engines over time, twice the expected increase in watercraft activity would not result in the deterioration of ambient air quality or the exceedance of an applicable air quality standards for ozone, PM₁₀, or PM_{2.5}. It would also not contribute to nonattainment designation with respect to the California ambient air quality standards and numeric TRPA threshold standards for ozone and PM₁₀.

Also shown in Table 3-5, twice the projected increase in watercraft activity would result in a net increase in CO emissions. The largest net increase would be 578 pounds per day during a peak summer day at the buildout year (2040). It is not anticipated that the increases in CO emission would result in or contribute to a localized exceedance of the ambient air quality standards for CO (i.e., 6 parts per million in the LTAB) because watercraft activity would not be concentrated in any one location and because CO disperses rapidly with distance from the source under normal meteorological conditions. Also, background concentrations of CO are greatest during the cold, stagnant conditions in winter months (CARB 2004:3), the time of year when recreational watercraft activity is the lowest.

Moreover, an increase in CO of 578 pounds per day during a peak day in summer, equivalent to 0.3 ton per day, would not result in the exceedance of the regional wintertime CO budgets used for analyses of transportation conformity in the LTAB as established in CARB's CO Maintenance Plan for the LTAB (CARB

2004). The regional wintertime budget for the portion of the LTAB in eastern El Dorado County is 19 tons per day and for eastern Placer County is 11 tons per day (CARB 2004:14). Projections for wintertime CO generated by on-road vehicles in 2035 is 0.41 tons per day and 0.31 tons per day in eastern El Dorado County and eastern Placer County, respectively (TRPA 2017:3-15). Thus, even if the increase in CO from California-registered watercraft were multiplied by a reasonable factor (e.g., 2) to account for an increase in activity by watercraft not registered in California, the mass of CO generated by twice the projected increase in watercraft activity under the Shoreline Plan would not conflict with implementation of the CO Maintenance Plan that is part of California's State Implementation Plan. Thus, even if the watercraft activity associated with the proposed Shoreline plan were twice the expected amount, implementing the proposed Shoreline Plan would not result in a significant impact related to criteria air pollutant emissions.

3.1.5 Master Response 5 – Growth and Mitigation under the Existing Shorezone Regulations

The Draft EIS includes Alternative 2 as the no project alternative. This alternative would maintain the existing TRPA Shorezone Ordinances, which would allow the development of shoreline structures to occur consistent with existing regulations. Several comments addressed the analysis of the No Project Alternative (Alternative 2 – Maintain Existing TRPA Shorezone Regulations). These comments questioned the estimates of the number of new shoreline structures that could be developed under Alternative 2, including the fish habitat mapping that was used to estimate development capacity. Comments suggested that the EIS should more clearly present the level of growth that could occur under Alternative 2, after proposed mitigation measures are incorporated.

NO PROJECT ALTERNATIVE REQUIREMENT

The Tahoe Planning Compact (Public Law 96-551) requires that an EIS prepared by TRPA evaluate alternatives to the proposed project. Although the Compact, TRPA Code, and Rules of Procedure do not require evaluation of a no project alternative, Section 1502.14(d) of the Council on Environmental Quality Regulations for Implementing the National Environmental Policy Act and Section 15126.6(e) of the State CEQA Guidelines require assessment of a no action alternative and a no project alternative, respectively. Similarly, TRPA EISs include evaluation of a no project alternative to allow decision makers to compare the environmental effects of taking an action with those associated with not taking it.

As described in the Draft EIS (Draft EIS pages 2-39 through 2-43), Alternative 2, the No Project Alternative, would retain the existing TRPA shorezone regulations, including the Shorezone Subelement of the Regional Plan goals and policies, and the existing TRPA Shorezone Code (Code of Ordinances Chapters 80–86). This alternative would lift the temporary moratorium on new shoreline structures that has been in place since 2010 because that moratorium is in effect “until the completion of additional environmental review by TRPA” (see TRPA Governing Board Resolutions 2011-09 and 2014-04). This EIS constitutes the additional environmental review to which TRPA Governing Board Resolutions 2011-09 and 2014-04 refer. Therefore, upon certification of this EIS, the temporary moratorium on new shoreline structures would be lifted, and applications for such structures would be reviewed consistent with the existing ordinances.

SHORELINE DEVELOPMENT ALLOWED BY EXISTING ORDINANCES

Growth and new development outside the shorezone in the Tahoe Region (e.g., residential, commercial, and tourist accommodation development) is strictly capped by the TRPA Code with numerical limits on the total amount of each development type (see TRPA Code Chapters 50–53). The existing TRPA Code does not include similar numerical caps on the number of new shoreline structures. Instead, shoreline structures are limited by the number of littoral parcels, prohibitions on the placement of new structures in stream mouth protection areas and areas designated by TRPA as prime fish habitat, and setback standards (see TRPA Code Sections 84.5.1, 84.6.1, 84.7.1, 84.8.1, and 84.9.2).

To develop a reasonable estimate of the number of new shoreline structures that could be developed under the existing ordinances, TRPA performed a geographic information system analysis that identified parcels with shoreline development potential and excluded parcels that would not meet location standards for new structures (Draft EIS Appendix A pages 16–18). The analysis assumed that parcels would not be eligible for new shoreline structures if they:

- ▲ are not littoral,
- ▲ are deed-restricted to prohibit new shoreline structures,
- ▲ already contain the maximum number of existing structures allowable for the parcel,
- ▲ are located within a stream mouth protection area,
- ▲ are located within prime fish habitat, or
- ▲ would not be able to comply with setback standards because of parcel size and the location of adjacent existing structures.

Some comments inquired about the difference between the No Project Alternative buildout estimates of this EIS and those developed by TRPA for the 2004 Lake Tahoe Shorezone Ordinance Amendments Draft EIS (TRPA 2004:2-11 through 2-13). The previous estimate assumed that parcels would not be eligible for new shoreline structures if they:

- ▲ are not littoral,
- ▲ already contained the maximum number of existing structures allowable for the parcel,
- ▲ are located within prime fish habitat, or
- ▲ are less than 50 feet in width.

The no project buildout estimates in this EIS reflect the best available information, including data that were unavailable in 2004. The current estimates consider additional development constraints (i.e., existing deed restrictions, stream mouth protection areas, and parcel-specific setback constraints) and more accurate and fine-grained data on the location of prime fish habitat.

The location and extent of prime fish habitat are primary factors that limit the potential for new shoreline structures under the existing ordinances. Estimates in the 2004 EIS were based on a prime fish habitat map adopted by TRPA in 1984, which was, in turn, based on the results of a coarse-scale fish habitat survey conducted in 1971 (Byron et al. 1989). This EIS estimates the location and extent of prime fish habitat based on the results of an extensive recent study of fish habitat in Lake Tahoe that incorporated state-of-the-art remote sensing data and analytical approaches (O’Neil-Dunne et al. 2016). The differences between these mapping approaches are described in the 2015 Threshold Evaluation Report, which notes that “the higher resolution imagery and multiple images used to create the substrate map...offer a significant improvement over prior maps” (TRPA 2016:7-24).

The 1984 prime fish habitat map is used by TRPA only as a first screen in the review of proposed shoreline projects to determine whether fish habitat surveys are necessary. When TRPA receives an application for a shoreline project, it refers initially to the 1984 fish habitat map, and if the project site is shown in prime fish habitat, TRPA requires a site-specific fish habitat survey (TRPA 2011). In many cases, such surveys determine that areas depicted as prime fish habitat on the 1984 map do not actually contain prime fish habitat. The more current map used for this EIS analysis more closely reflects the actual location and extent of prime fish habitat that would be determined through future site-specific habitat surveys of proposed project sites. Because the mapping used in this EIS is more accurate, it provides a more accurate estimate of the constraints to shoreline development that would apply under Alternative 2, the No Project Alternative. Thus, the Draft EIS appropriately and more accurately estimates buildout conditions under Alternative 2 based on the best available information.

MITIGATION MEASURES THAT REDUCE DEVELOPMENT POTENTIAL

Comments suggest that the description of the proposed project and alternatives (Chapter 2 of the Draft EIS) does not accurately convey the level of development and boating activity that would occur under Alternative 2 because no estimate of the number of structures or hours of boat use that would be expected to occur after implementation of mitigation measures is provided.

The Draft EIS accurately describes the amount of development that could occur under Alternative 2, both as proposed and after implementation of recommended mitigation measures. Chapter 2 of the Draft EIS describes each of the Shoreline Plan alternatives as they are proposed (i.e., without mitigation measures, which were subsequently added and described elsewhere to address significant impacts). Each of these alternatives is evaluated in Chapters 4–17 of the Draft EIS. Where the EIS identifies significant impacts that would result from implementing an alternative, it recommends mitigation measures to avoid or minimize those impacts. The Draft EIS accurately presents the number of new shoreline structures and associated boat use that would result under the No Project Alternative based on the shoreline development estimates described above (Draft EIS pages 2-15 through 2-21, 2-39 through 2-43). The Draft EIS presents the recommended mitigation measures in the executive summary and describes the effects of the mitigation in multiple locations (Draft EIS pages 6-27, 8-23 and 8-24, 10-20, 15-20). Together the presentation of Alternative 2 before and after mitigation provides full disclosure of the development that could occur under the no project alternative.

The Draft EIS identifies several significant impacts resulting from the level of shoreline development and associated boating activity that would occur under Alternative 2, and the comments are correct that mitigation measures would reduce the number of new structures that could be developed. Specifically, the Draft EIS found that Alternative 2 would have significant or potentially significant impacts related to water quality, recreation, air quality, and public health and safety through increases in boating activity that would occur at buildout of the shoreline under the existing TRPA shorezone ordinances. To reduce these significant and potentially significant effects, the EIS recommended adoption of Mitigation Measures 6-3, 8-1b, 10-1, and 15-1b, which would limit the total number of new moorings and boat ramps (i.e., structures that result in additional boating capacity) to the number authorized under Alternative 1 (the Proposed Shoreline Plan).

The analysis did not determine, as some comments suggest, that the proposed Shoreline Plan represented the maximum capacity for boating structures. Rather, it determined that the number of boating structures associated with the proposed Shoreline Plan would result in less than significant effects on water quality, recreation, air quality, and public health and safety. Therefore, by adopting mitigation measures that restrict the number of boating structures under Alternative 2 to the number analyzed under Alternative 1, TRPA could be assured that the mitigation would reduce the impacts to a less-than-significant level. TRPA could consider other mitigation measures that would allow a greater number of boating structures and still reduce impacts to a less-than-significant level. However, TRPA has no obligation to consider the maximum number of alternatives available or structures possible or to adopt alternate mitigation when it has already identified feasible and effective mitigation.

Several comments also requested additional detail on the number of structures and level of boating activity that would occur under Alternative 2 after implementation of mitigation measures. As requested in public comments, Tables 3-6 and Exhibits 3-11 through 3-14, below, present a comparison of the number of structures that could be constructed under each alternative after implementation of mitigation measures. Table 3-7 and Exhibit 3-15, below, depict the estimated boating activity of each alternative after implementation of mitigation measures.

Table 3-6 Maximum Number of Shoreline Structures at Buildout of Each Alternative after Mitigation

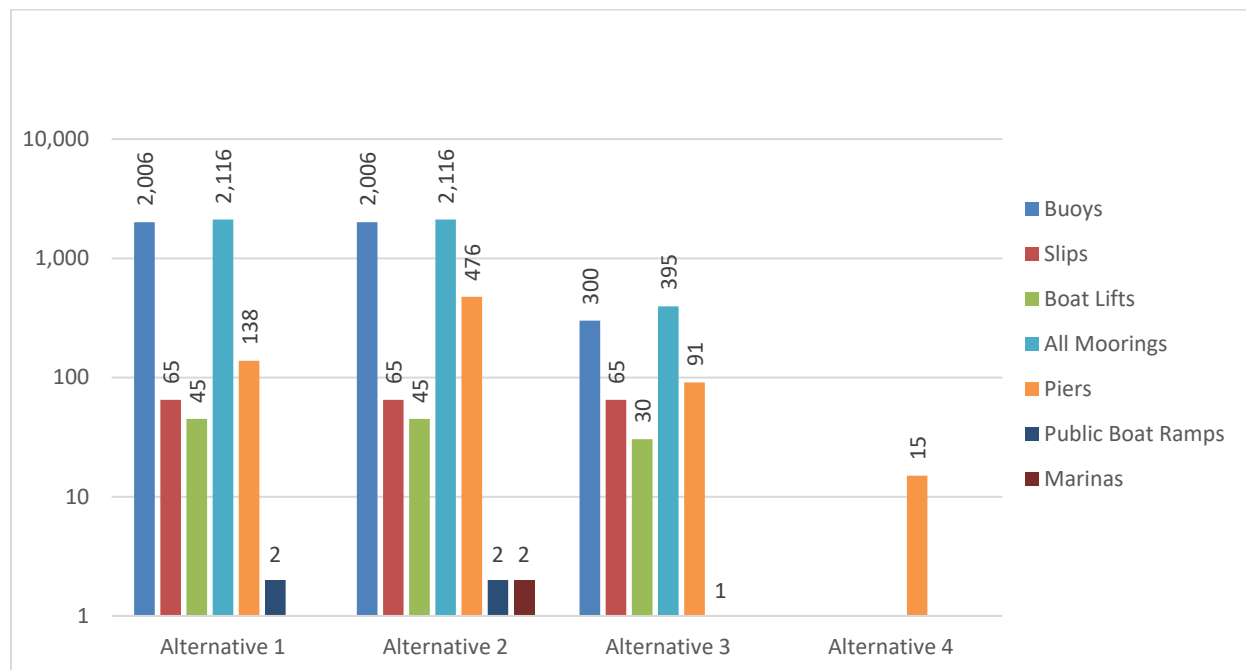
Structure	Baseline Conditions	Alternative 1 - Proposed Shoreline Plan	Alternative 2 - Maintain Existing TRPA Shorezone Regulations (No Project) ¹	Alternative 3 - Limit New Development	Alternative 4 - Expand Public Access and Reduce Existing Development
Moorings					
Buoys ²	4,200	6,206	6,206	4,500	4,200
Slips ²	4,105	4,170	4,170	4,170	4,105
Boat lifts ²	261	306	306	291	261
Boat houses	165	165	165	165	165
All moorings	8,731	10,847	10,847	9,126	8,731
Other Facilities					
Piers	762	900	1,238	853	777
Public and quasi-public boat ramps	22	24	24	23	22
Private boat ramps ³	16	16	16	16	16
Marinas	14	14	16	14	14

¹ Mitigation Measures 6-3, 8-1b, 10-1, and 15-1b limit the total number of moorings and boat ramps that could be authorized under Alternative 2.

² The total number of moorings is capped, but the buoy, slip, and lift numbers for Alternatives 1, 2, and 3 are estimated. Buoys and slips may be exchanged on a 1:1 basis at marinas or by public agencies.

³ Private boat ramps are structures that are identical in form to public and quasi-public boat ramps but that function more like a mooring in that generally only a single user/boat launches from that location.

Source: Appendix A of the Draft EIS

**Exhibit 3-11 New Shoreline Structures at Buildout of Each Alternative after Mitigation**

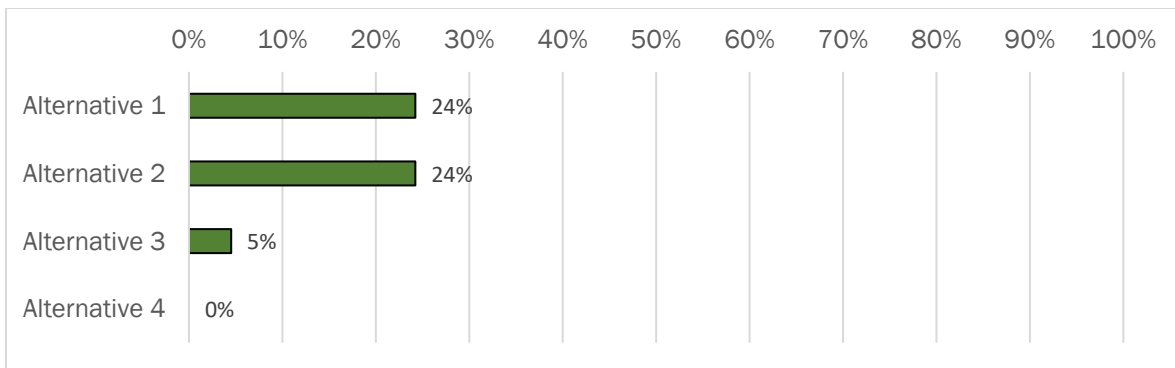


Exhibit 3-12 Estimated Percent Increase in Moorings under Each Alternative after Mitigation

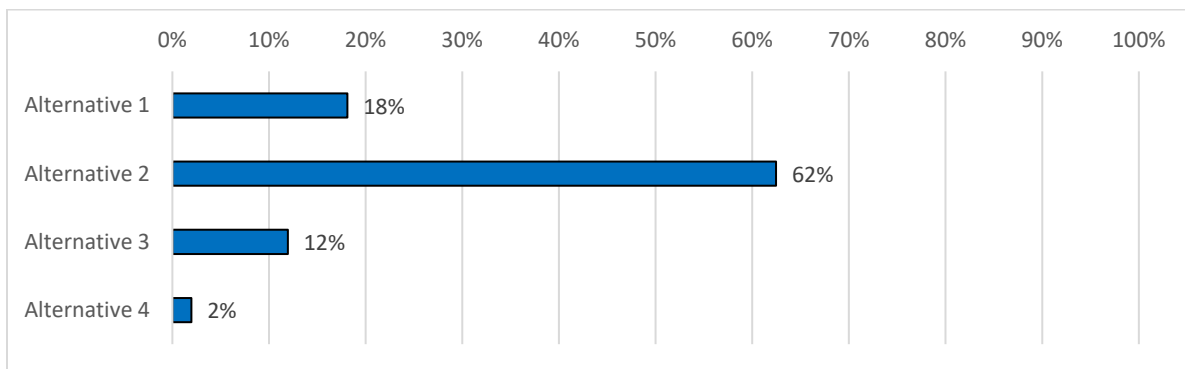


Exhibit 3-13 Estimated Percent Increase in Piers under Each Alternative after Mitigation

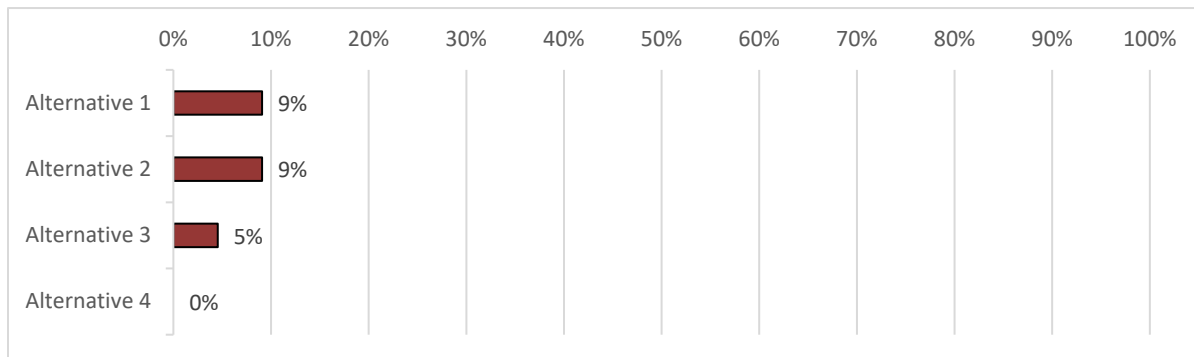
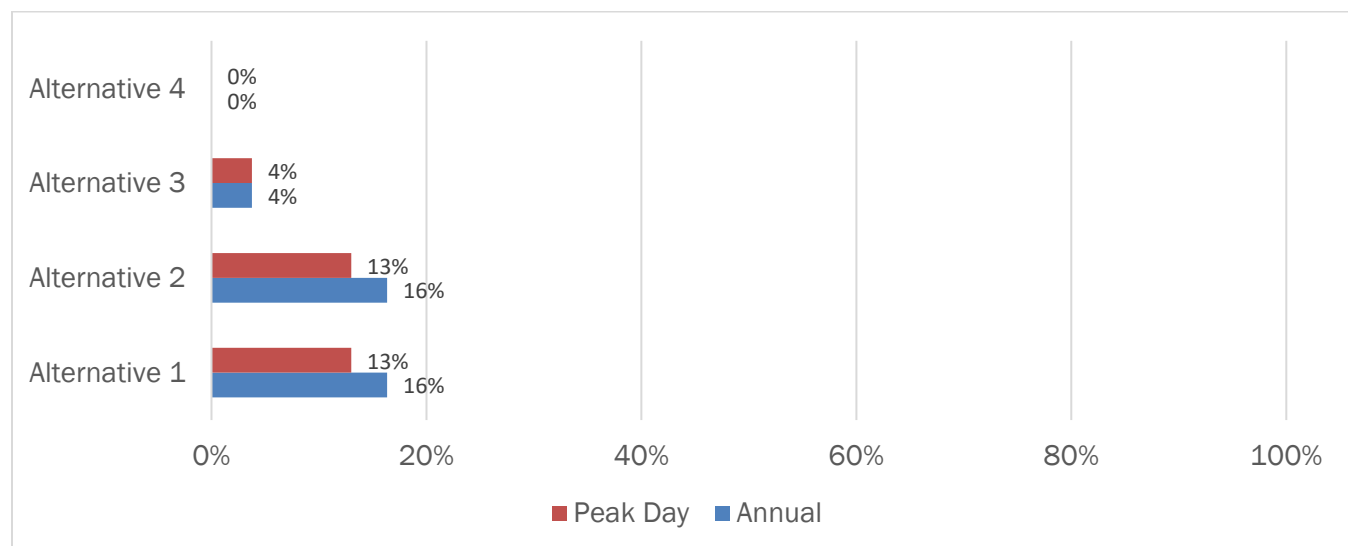


Exhibit 3-14 Estimated Percent Increase in Boat Ramps under Each Alternative after Mitigation

Table 3-7 Projected Boating Activity under Each Alternative after Mitigation

	Project Effects (Peak Day)	Project Effects (Annual)	Buildout (Peak Day)	Buildout (Annual)
Engine-Hours				
Baseline conditions	12,512	489,155	No change	No change
Alternative 1	+1,584	+77,659	14,096	566,814
Alternative 2	+1,584	+77,659	14,096	566,814
Alternative 3	+469	+18,213	12,982	507,368
Alternative 4	0	0	Same as baseline	Same as baseline
Boat Trips				
Baseline conditions	5,899	234,102	No change	No change
Alternative 1	+767	+38,257	6,666	272,359
Alternative 2	+767	+38,257	6,666	272,359
Alternative 3	+222	+8,820	6,121	242,923
Alternative 4	0	0	Same as baseline	Same as baseline

**Exhibit 3-15 Estimated Percent Increase in Boat Trips under Each Alternative after Mitigation**

3.1.6 Master Response 6 – Monitoring and Adaptive Management of the Shoreline Plan

Several comments inquired as to how TRPA monitors environmental changes, including those changes that could occur as a result of the Shoreline Plan. Some comments request additional monitoring or seek clarification about monitoring included in the proposed Shoreline Plan. Other comments suggest that the Shoreline Plan should include an expanded adaptive management process. To provide a comprehensive response to comments on the Shoreline Plan and planning process, this response addresses the following topics:

- ▲ threshold evaluations and regional adaptive management,
- ▲ water quality monitoring and adaptive management,
- ▲ noise monitoring and adaptive management
- ▲ air quality monitoring and adaptive management, and
- ▲ recreation monitoring and adaptive management.

THRESHOLD EVALUATION AND REGIONAL ADAPTIVE MANAGEMENT

The Compact is the foundation of TRPA's mandate to manage and conserve the unique resources of the Tahoe Region. It directs TRPA to establish threshold standards to maintain significant scenic, recreational, educational, scientific, or natural values and to maintain public health and safety in the Tahoe Region. The Compact also directs TRPA to develop an enforceable regional plan that attains and maintains the adopted thresholds, which fall into nine categories: air quality, water quality, soil conservation, scenic resources, wildlife, fisheries, vegetation preservation, recreation, and noise. TRPA Resolution 82-11, as amended, lists the adopted thresholds and includes relevant information.

The Regional Plan's Monitoring and Evaluation Subelement guides TRPA's evaluation of progress toward attaining and maintaining thresholds. TRPA evaluates the status and trends of threshold indicators every 4 years, and uses the evaluation as the basis, in part, to propose updates to the Regional Plan. The threshold evaluation involves the assessment of the status and trends of over 150 different standards. Most are numeric standards that are quantitatively evaluated based on the best available data; others reflect policy statements or management standards that are qualitatively evaluated to determine if the policy or management direction has been implemented through existing programs and regulations.

The threshold evaluation identifies the attainment status of each threshold standard and, where possible, provides an estimated date for attainment of standards that are not currently being achieved. TRPA maintains a list of compliance measures, or actions being taken to attain and maintain threshold standards, and supplemental compliance measures, or those additional measures that TRPA will or could take to ensure attainment and maintenance of thresholds.

For each threshold standard, the threshold evaluation identifies the status and trend of the relevant environmental condition. It reports the primary human and environmental factors that affect the environmental condition, evaluates the effectiveness of programs and actions intended to achieve and maintain the standard, and provides recommendations to better achieve and maintain the standard. Each threshold evaluation report is independently peer-reviewed by a panel of experts in relevant disciplines to verify that the evaluation provides adequate and reliable information to inform policy decisions.

The threshold evaluation guides adjustments to the Regional Plan, Code, and implementation programs. Information from the threshold evaluation is considered in combination with regional plan performance measures, sustainability indicators, EIP reporting, and other sources of information, to identify modifications to the Regional Plan and its implementation programs necessary to attain and maintain thresholds (Exhibit 3-16). This process of evaluating the status and trends of different threshold standards, synthesizing this information with other monitoring and reporting data, and amending the Regional Plan and implementation programs is a comprehensive regional adaptive management process. The process allows TRPA to adapt to changing conditions and unforeseen issues and identify new or different management approaches necessary to achieve and maintain thresholds.

Some comments suggest that the proposed Shoreline Plan should include an adaptive management program. As an element of the Regional Plan, the Shoreline Plan would be adaptively managed through the existing threshold evaluation and regional adaptive management process. Sections 84.3.2.E.7 and 84.4.4.G of the proposed Shoreline Code specifically require that TRPA review and revise, as necessary, the allocation of new moorings and piers based on the results of threshold evaluations. Future threshold evaluations would evaluate the status and trends of threshold conditions, identify drivers of threshold decline, if any, and recommend programs or actions to more effectively achieve and maintain the thresholds. If a threshold evaluation identified drivers of threshold decline associated with the Shoreline Plan, it would recommend adaptive management actions, such as revisions to the allocation of shoreline structures or additional boating regulations, to address the decline.



Source: Prepared by TRPA in 2012

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Exhibit 3-16 Regional Plan and Adaptive Management Flowchart



The Shoreline Plan, once adopted, is incorporated into and becomes part of the Regional Plan. As part of the Regional Plan, the Shoreline Plan is then subject to all of the Regional Plan's monitoring and adaptive management programs and processes. The Shoreline Plan encompasses, incorporates, and relies on already ongoing and adopted monitoring programs and adaptive management. The plan here adds expanded monitoring and adaptive management programs focused on specific topics where there may be data gaps or limited information, as described below. However, creating a separate monitoring and adaptive management program focused solely on the Shoreline Plan, as some comments suggest, is unnecessary in consideration of the programs and activities that already exist. Adaptive management too narrowly focused on the Shoreline Plan would likely miss opportunities for more effective management actions because environmental conditions are affected by a wide range of factors, many of which may be partially or minimally regulated by the Shoreline Plan. By narrowly focusing on the Shoreline Plan, such an adaptive management program would ignore many of the factors or beneficial management actions affecting environmental conditions and would likely result in adaptive management actions that are ineffective because they do not consider the full range of factors that drive changes in environmental conditions. Such a program would also divert limited resources from the existing effective regional adaptive management program to a more limited and less effective program.

Expanded Shoreline Monitoring and Adaptive Management Programs

In addition to regular threshold monitoring, TRPA would adopt, through the proposed Shoreline Plan, additional targeted monitoring programs to detect unforeseen changes in the environment and provide additional information to inform the regional adaptive management process. TRPA has committed to initiating, expanding, or enhancing Shoreline-specific monitoring activities for water quality, noise, and recreation. Note that this newly added Shoreline-specific monitoring would become a part of the broader, comprehensive program of monitoring environmental indicators within the Tahoe Region that is implemented by TRPA in collaboration with the more than 50 organizations of the EIP partnership. Descriptions of existing and expanded monitoring programs for water quality, noise, air quality, and recreation are included below.

In addition to the monitoring programs described below, TRPA's EIP Division would be responsible for collecting information on boating at aquatic invasive species inspection stations and public boat ramps, as well as implementing mitigation programs identified in the Draft EIS and EIP projects (for more information on the EIP, see Section 2.6.3 of the Draft EIS). TRPA's Current Planning Division would be responsible for tracking pier and buoy permits by location and user type (e.g., public, private).

WATER QUALITY MONITORING AND ADAPTIVE MANAGEMENT

TRPA and partner agencies together administer comprehensive water quality monitoring programs, which address a broad spectrum of water quality parameters. These programs track the status and trends of ambient water quality conditions, assess the effectiveness of water quality improvement programs, and detect potential sources of water quality degradation. The results of these programs directly inform the Regional Plan's adaptive management, EIP programs and projects, and water quality planning initiatives within the Tahoe Region. Expanded water quality monitoring under the proposed Shoreline Plan would supplement the growing body of information on trends and drivers of water quality in Lake Tahoe. A list of current (ongoing) water quality planning initiatives in the Tahoe Region is provided below in Table 3-8.

Expanded Nearshore Turbidity Monitoring

As a part of the proposed Shoreline Plan, TRPA would expand the existing Nearshore Water Quality Monitoring Network to evaluate the extent to which boating activity affects nearshore turbidity (see Draft EIS page 2-39). As described for Impact 6-2 in the Draft EIS (see Draft EIS pages 6-19 through 6-24), boating activity has the potential to generate and alter wave action in shallow portions of the nearshore and suspend available lake bottom sediments. Sediment suspension is unlikely to affect midlake clarity but has the potential to produce temporary declines in nearshore clarity. Enforcement of slow speeds for boats within the no-wake zone would reduce wave generation potential; however, some areas of the nearshore extend beyond the no-wake zone, and the proposed monitoring is intended to compare turbidity in those areas with

Table 3-8 Lake Tahoe Water Quality Monitoring Programs

Project	Investigator	Years	Funders	Brief Description	Constituents Measured	Waterbody
Secchi Depth and Pelagic Monitoring	UC Davis	1968–Present	TRPA / UC Davis	UC Davis collects water quality data mostly focused on the clarity and nutrients in pelagic Lake Tahoe.	Secchi Depth, VEC, SEC, Dissolved Oxygen, Nitrate, Soluble Phosphorus, Chl-A, fluorescence, primary productivity, temperature	Lake Tahoe
Atmospheric Deposition Into Lake Tahoe	UC Davis	1968–Present	TRPA / UC Davis	UC Davis measures the direct atmospheric deposition of nutrients and particulate matter that reduce the clarity of Lake Tahoe.	Nutrients and particulate matter from atmospheric deposition into Lake Tahoe.	Lake Tahoe
Periphyton/ Phytoplankton Species Composition and Algal Growth Potential/ Nearshore Network	UC Davis	2000–Present	Lahontan Regional Water Quality Control Board / UC Davis	UC Davis measures attached algae all around the nearshore of Lake Tahoe to determine changes in nutrient loading and eutrophication, as well as lake trophic status.	Attached algae (periphyton)	Lake Tahoe
Regional Stormwater Monitoring Program	Tahoe – RCD	2001–2011 (UCD) 2013-present Tahoe RCD	SNPLMA, State Water Board, EDC, CSLT, Placer, Washoe, Douglas, NDOT, Caltrans	The RSWMP program measures sediments load and nutrients at selected stormwater discharge locations, some in tributaries to Lake Tahoe and some that flow into Lake Tahoe itself.	Suspended sediment and nutrients	Stormwater basins
Lake Tahoe Interagency Monitoring Program LTIMP	USGS	2000–current	USGS/TRPA/Lahontan/CT C	LTIMP measures sediment and nutrients in 7 of the largest tributaries to Lake Tahoe.	Sediment load, water temperature, nutrient load	Tributaries
Stream Bioassessment	TRPA, Lahontan Regional Water Quality Control Board, Nevada Department of Environmental Protection	2009–current	TRPA	TRPA monitors stream habitat and benthic macroinvertebrates in tributaries to Lake Tahoe to determine changes in stream habitat and water quality.	Benthic macroinvertebrates (indicators of water quality) and stream habitat (fish habitat)	Tributaries
Pilot Implementation of Lake Tahoe Nearshore Monitoring Framework for Clarity Metrics	DRI	2017–current	Nevada Division of State Lands	In this pilot program, DRI measures turbidity in the nearshore of Lake Tahoe. The focus of this effort is to develop and refine methods for data collection.	Turbidity, light transmissivity, chlorophyll	Lake Tahoe

Table 3-8 Lake Tahoe Water Quality Monitoring Programs

Project	Investigator	Years	Funders	Brief Description	Constituents Measured	Waterbody
Community Structure Pilot Monitoring	UNR	2017–current	Lahontan Regional Water Quality Control Board, NDEP, TRPA	This pilot program examined plants, fish, crayfish and macroinvertebrates in the Lake Tahoe nearshore, and the preliminary report gives the Lahontan Regional Water Quality Control Board and its partners the first opportunity to view the health of these organisms in one unified report.	Aquatic vertebrates and macroinvertebrates	Lake Tahoe
Pilot Metaphyton Monitoring	UC Davis	2017–current	Nevada Division of State Lands	Metaphyton is algae that are neither attached nor planktonic. Along with periphyton, it is cited as a nuisance in the nearshore. UCD-TERC is conducting a pilot monitoring effort focusing on developing methods to estimate the distribution and biomass of metaphyton washing up on three beaches: Round Hill Pines Beach, NV, El Dorado Beach, CA and Regan Beach, CA.	Unattached algae (metaphyton)	Lake Tahoe
Nearshore Human Health Monitoring	Nevada Tahoe Conservation District, Tahoe RCD, DRI	2018-current	Lahontan Regional Water Quality Control Board	NTCD will conduct periodic monitoring of harmful microorganisms and toxins that affect human health in Lake Tahoe's nearshore.	Microorganisms and toxins such as coliform and cyanotoxins.	Lake Tahoe
Lake Tahoe Drinking Water Monitoring (Lake Tahoe surface Water Used as Drinking Water)	Lake Tahoe Water Suppliers Association	Current	Lake Tahoe Water Suppliers Association	All water suppliers in Lake Tahoe that collect drinking water from Lake Tahoe (10 suppliers serving 27,000 people) itself are required to monitor water quality at the drinking water intakes in Lake Tahoe. This monitoring does not apply to Lake Tahoe's largest drinking water supplies, South Lake Tahoe Public Utility District, because they get their water from wells, not Lake Tahoe surface water.	Turbidity, arsenic, and dozens of bacterial constituents. Herbicides are not measured at these intakes which is a concern if the Water Suppliers Association if herbicides are used to control aquatic invasive species in the Tahoe Keys.	Lake Tahoe
Incline Village Beaches Water Quality Monitoring	Incline Village General Improvement District	Current	Incline Village General Improvement District	IVGID monitors water quality at tributaries and in the nearshore of Lake Tahoe in and around its' recreational beaches.	Temperature, turbidity, total coliform, fecal coliform, total dissolved solids, and dissolved oxygen	Lake Tahoe
Lake Tahoe "Clean Marina" Water Quality Monitoring	Lahontan Regional Water Quality Control Board and private	All	Lahontan Regional Water Quality Control Board and private	Lahontan Regional Water Quality Control Board requires Lake Tahoe marinas on the California side to monitor discharge into the lake before and after storm events and in the surface waters of Lake Tahoe.	Stormwater: Total Nitrogen, Total Phosphorous, Iron, Turbidity, Oil and Grease, pH, Total Suspended Solids, Hardness, Aluminum, Copper, Lead, and Zinc	Lake Tahoe

Table 3-8 Lake Tahoe Water Quality Monitoring Programs

Project	Investigator	Years	Funders	Brief Description	Constituents Measured	Waterbody
					Surface water: Total nitrogen, total phosphorus, turbidity, aluminum, copper, iron, lead, mercury, zinc, pH and hardness. Additional four samples between July 1 and August 1 of each year within five feet of the fueling docks for total petroleum hydrocarbon (gasoline and diesel), and (combined) oil and grease. Five samples must be taken between July 1 and August 1 of each year for bacteria (fecal and <i>E. coli</i>).	
Nearshore Monitoring Network	Public/private partnership	2015–current	Public/private partnership, Lahontan	There are 11 continuous monitors deployed in Lake Tahoe’s nearshore which mostly focus on factors contributing to nearshore clarity decline.	Turbidity, chlorophyll, DO, temp, EC, and wave height	Lake Tahoe
Lake Tahoe Tributary Algae Monitoring	Lahontan Regional Water Quality Control Board	2000–current	Lahontan Regional Water Quality Control Board	The Lahontan Regional Water Quality Control Board occasionally monitors algal growth in tributaries to Lake Tahoe, as well as harmful bacteria such as fecal coliform if a problem is suspected.	Algae, fecal coliform	Tributaries
Nevada Department of Environmental Protection Tributary Water Quality Monitoring	NDEP	1992–current	NDEP	NDEP samples tributaries on the Nevada side of Lake Tahoe on a regular basis for bacteria, nutrients, as well as some biological elements such as dissolved oxygen.	Measurements are taken on chloride, nitrate, nitrite, phosphorus, sulfate, hardness, total dissolved solids (TDS), alkalinity, total coliform, fecal coliform, and <i>Escherichia coli</i> (<i>E. coli</i>), temperature, pH, and dissolved oxygen. Qualitative information is also collected on substances attributable to domestic or industrial waste or other controllable sources including settleable solids that form bottom or sludge deposits; floating debris, oil, grease, scum, and other floating materials; odor, color, turbidity, or other conditions.	Tributaries

turbidity in areas of the nearshore that are within the no-wake zone. The data could be combined with data collected from other water quality programs with nearshore sensors to evaluate drivers of nearshore turbidity, including assessing the degree to which boating affects nearshore turbidity. The program would involve installation and up to 2 years of operation for turbidity monitors. Funding for the program would be provided through fees collected during the 2008–2010 shorezone program (see Appendix A, “Shoreline Implementation Program,” of this Final EIS for more information).

If the results of monitoring indicate that boating activities could be contributing to an exceedance of TRPA’s nearshore turbidity threshold, adaptive management actions would be implemented. Adaptive management actions could include, but would not be limited to:

- ▲ expanding the no-wake zone based on scientific findings and recommendations for nearshore areas identified to be susceptible to reduced clarity from boating activities or
- ▲ enacting a nearshore water quality mitigation, for example: a fee on recreational watercraft and use of the revenue to fund compensatory mitigation projects that reduce other sources of nearshore water quality impairment, such as stormwater management projects or fertilizer reduction initiatives.

NOISE MONITORING AND ADAPTIVE MANAGEMENT

TRPA and partner agencies administer lake-wide noise monitoring surveys for both single-event and community noise equivalent levels (described on pages 12-5 through 12-6 and 12-9 of the Draft EIS). Details of these noise monitoring programs are presented in Table 3-9.

To monitor noise from motorized watercraft, TRPA has a network of 10 noise monitoring stations at several locations around the lake, which are monitored every 2 years. When the results of monitoring at these locations indicate exceedances of noise standards, TRPA increases patrols in identified problem areas and engages with boaters in those areas to educate them on the noise ordinances. This on-the-lake education is currently the primary mechanism for noise compliance.

Enhanced Noise Monitoring

TRPA has revised the proposed Shoreline Plan to expand noise monitoring along the shoreline to better detect, identify, and address noise sources. The existing noise monitoring program would be expanded to include updated noise monitoring equipment with photo identification capability that could positively identify boats that contribute to a violation of noise standards. As described in Chapter 2, “Changes to the Proposed Shoreline Plan,” of this Final EIS, TRPA would also revise the Code to ban certain types of boats that exceed noise standards. This expanded monitoring approach in combination with the Code revision, would allow TRPA and implementing partners to identify categories of boats that exceed noise limitations and better enforce noise standards. If the results of noise monitoring indicate excessive noise violations or specific areas of concern, TRPA would take adaptive management actions. Adaptive management actions could include but would not be limited to:

- ▲ increasing the presence of the TRPA and other law enforcement boat crews in areas where ongoing noise exceedances have been identified;
- ▲ issuing cease-and-desist orders or other enforcement actions to operators of watercraft found repeatedly in violation of noise standards; and/or
- ▲ entering into MOUs with partner organizations to prohibit the moorage or launch of boats with equipment likely to exceed noise standards, unless they are proven compliant.

Table 3-9 Lake Tahoe Noise Monitoring Programs

Project	Investigator	Years	Funders	Brief Description	Parameters Measured	Monitoring Location(s)
TRPA Plan Area Noise Monitoring	TRPA	1982-Present	TRPA	TRPA monitors background noise levels in all local Plan Areas in the Tahoe Basin to ensure noise levels are not disturbing people and wildlife, and to maintain the unique characteristics of the Basin. Each local Plan Area has its own allowable noise level in TRPA's thresholds, with maximum average 24-hour allowable noise levels ranging from 45 decibels (dB) in wilderness areas to 65 dB in industrial areas.	TRPA uses a Community Noise Equivalent Level (CNEL) measure to assess whether noise levels are being exceeded in Plan Areas. The CNEL averages decibel levels over a 24-hour period, with excess noise late at night and early in the morning being weighted greater due to humans and wildlife being more sensitive to noise at these times. Noise monitors are generally placed in Plan Areas for 1-2 weeks during peak noise periods.	TRPA monitors 35 Area Plans per year, and re-visits each site once every 4 years (140 total sites within local Plan Areas are monitored).
TRPA Highway Noise Monitoring	TRPA	2001-Present	TRPA	TRPA monitors background noise levels along all major highways in the Tahoe Basin including Highways 50, 28, 431, 267, 89, and 207. Highway noise is monitored to ensure local Plan Areas are not overly impacted by highway noise. Each highway has its own allowable noise level in TRPA's thresholds at 300 feet from the highway edge, with maximum average 24-hour allowable noise levels ranging from 55 decibels (dB) on more rural highways (Mt. Rose highway) to 65 dB on major highways (Hwy 50 in South Lake Tahoe).	TRPA uses a Community Noise Equivalent Level (CNEL) measure to assess whether noise levels are being exceeded along highways. The CNEL averages decibel levels over a 24-hour period, with excess noise late at night and early in the morning being weighted greater due to humans and wildlife being more sensitive to noise at these times. Noise monitors are generally placed along highways for 1-2 weeks during peak noise periods.	TRPA monitors 7 to 8 highway locations per year, and re-visits each site once every 4 years (30 total highway locations monitored; multiple locations along each highway).
TRPA Lake Tahoe Shoreline Noise Monitoring	TRPA	2000-Present	TRPA	TRPA monitors noise from motorized watercraft along Lake Tahoe's shoreline. Noise from boats along Lake Tahoe's shoreline is monitored to ensure noise is not damaging to the public's enjoyment of the lake and does not damage wildlife. Under TRPA code, noise from boats is not allowed to exceed 75 dB for a "one-time event" (a boat passing by, for example).	TRPA uses a single-event noise threshold to assess whether noise levels are being exceeded in the shoreline. All noise events over 75 dB are automatically recorded, and then listened to by a noise technician to differentiate between noise from boats and non-boats (waves, airplanes, etc.). Noise monitors are generally placed in the shoreline for 2+ weeks during peak noise periods (July 4th to Labor Day).	TRPA monitors 10 shoreline locations around the lake at least once every 2 years.

AIR QUALITY MONITORING AND ADAPTIVE MANAGEMENT

TRPA conducts long-term air quality monitoring in coordination with multiple partner agencies at six sites around the Tahoe Basin (Table 3-10). This comprehensive approach monitors a wide array of air pollutant constituents with data collected through programs operated by the states, local jurisdictions, and the national Interagency Monitoring of Protected Visual Environments (IMPROVE) programs. The results of air quality monitoring drives adaptive management to limit or regulate certain types of activities that are known to produce air pollutants. The expanded recreation monitoring, described below, would also help to inform air quality monitoring relative to the Shoreline Plan, because it would provide information on boating activity that could be used to validate assumptions and analysis in this EIS, and detect unexpected changes in boating activity.

RECREATION MONITORING AND ADAPTIVE MANAGEMENT

TRPA monitors the quality of and access to outdoor recreation opportunities through several metrics. Recreation user surveys are conducted every 5 years on U.S. Forest Service lands as part of the National Visitor Use Monitoring Program. This monitoring provides information on recreation activities and user satisfaction with various elements of the recreation experience. In addition, other recreation providers and tourism organizations conduct recreation user surveys on an as-needed basis. These user surveys provide valuable information on user perceptions of the quality of recreation opportunities, and they help to identify those aspects of the recreation experience that could be improved.

To achieve a fair share distribution of recreation opportunities throughout the Region, in 1987 TRPA established and implemented a “persons at one time” (PAOT) recreation capacity allocation system. The PAOT measure is an estimate of the number of individuals that a recreation facility or area can support at any given time. TRPA allocates PAOTs to recreation facilities and tracks the number of PAOTs relative to other forms of development to assess whether recreation capacity increases in proportion with private development. TRPA also tracks public land acquisitions and projects that provide additional recreation access, such as trails and trailheads, to assess trends in the amount of public access opportunities. Additional information on recreation monitoring is provided in Chapter 11 of the 2015 Threshold Evaluation Report (TRPA 2016). Additional information on public land acquisition programs is provided in Master Response 2 – Effects on Recreation.

The proposed Shoreline Plan would include additional recreation user surveys. This expanded monitoring would include surveys of beach users, surveys of motorized and nonmotorized watercraft users, and observations of recreation capacity along the shoreline. Monitoring would begin in 2019 and would occur on a coordinated schedule with environmental threshold monitoring. The results would be used to inform approaches to adaptive management for recreation as part of the regional threshold evaluation and adaptive management process. For example, if the data identify unforeseen significant changes in the quality of nonmotorized recreational experiences along the shoreline, TRPA or land management agencies could implement adaptive management measures, such as increasing the no-wake zone in targeted areas, providing additional enforcement or education, or revising recreation management practices at popular recreational sites or facilities.

Table 3-10 Lake Tahoe Air Quality Monitoring Programs

Project	Investigator	Years	Funders	Brief Description	Constituents Measured	Monitoring Location(s)
Tahoe Ambient Air Monitoring Program	Desert Research Institute (DRI) / Tahoe Regional Planning Agency / UC Davis Nuclear Laboratory / U.S. Forest Service	2011-Present	TRPA, U.S. Forest Service	Baseline ambient air quality conditions and track air quality trends.	Ozone (O ₃), Oxides of Nitrogen (NO ₂), Carbon Monoxide (CO), Particulate Matter (PM _{2.5} and PM ₁₀)	Monitoring occurs at 3 locations operated jointly by TRPA, DRI, and UC Davis, as well as one station that is operated by the U.S. Forest Service: <ul style="list-style-type: none"> Stateline, NV station (TRPA / DRI): The station at Stateline monitors CO, NO₂, O₃, and PM_{2.5}. DL Bliss State Park, CA station (USFS / TRPA / DRI / UC Davis): The station on the west shore of Lake Tahoe monitors O₃, PM_{2.5}, PM₁₀, and visibility. It is also part of a national network of monitors (IMPROVE network) that analyze visibility at the nation's most iconic visual resources, most of which are national parks. Lake Tahoe Community College, CA station (TRPA / LTCC / DRI / UC Davis): This station in South Lake Tahoe monitors PM_{2.5}, PM₁₀, O₃, and visibility. It is also part of a national network of monitors (IMPROVE network) that analyze visibility at the nation's most iconic visual resources, most of which are national parks.
Local Jurisdiction Air Quality Monitoring	California Air Resources Board (CARB), Washoe County, Placer County	2011-Present	California Air Resources Board, Washoe County, Placer County, TRPA	Baseline ambient air quality conditions and track air quality trends.	Ozone (O ₃), Particulate Matter (PM _{2.5} and PM ₁₀)	There are 3 locations operated by local jurisdictions in the Lake Tahoe Basin: <ul style="list-style-type: none"> Incline Village, NV station (Washoe County): This site monitors ozone (O₃). Tahoe City, CA station (Placer County / TRPA): This site monitors O₃ and PM_{2.5}. South Lake Tahoe, CA station (CARB): This site monitors PM₁₀.

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